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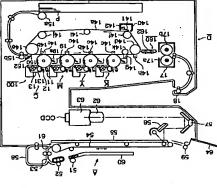
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カラー画像形成装置 (54) [発明の名称]

(51) [要約]

括定着するタンデム型カラー画像形成装置において、衰 【鞢題】 両面にカラートナー像を保持した転写材を一 異のカラー画像の色味に差のない良好な画質を得るこ

0 (C, Y, M, K) 上に形成されたトナー像を順次重 あるトナー像受像体14aを介して転写材である記録紙 Pの裏面にトナー像を形成するとともに、シアン、イエ ロー、マゼンタ、黒からなるカラートナー像の重ね合わ ね合わせるカラー画像形成装置において、中間転写体で 七題が、最初と最後がシアンと馬、その間がイエローと 【解決手段】 像形成体である各色毎の膨光体ドラム1 マゼンタであることを特徴とする。



[特許請求の範囲]

【諸坎項1】 像形成体上に形成されたトナー像を順次 を形成するとともに、イエロー、マゼンタ、シアン、黒 からなるカラートナー像の重ね合わせ順が、最初と最後 がシアンと馬、その間がイエローとマゼンタであること において、中間転写体を介して転写材の画面にトナー像 を特徴とするカラー画像形成装置。

[請求項3] 前記トナー像は前記転写材の数面に形成 「請求項2」 前記最後のトナー像が黒であることを特 れる要面画像であるかによって、その色補正を変更する ことを特徴とする請求項1又は2に記載のカラ一画像形 される被面画像であるか又は前配転写材の裏面に形成さ 散とする請求項1に記載のカラー画像形成装置。

前記黒のトナー像が下層になるときのト ナー付着量は、前記黒のトナー像が上層になるときのト ナー付着量に比べ大にすることを特徴とする請求項3に 記載のカシー画像形成装置。 [請求頃4]

[発明の詳細な説明] [0001]

定着する複写機、プリンタ、FAX等の電子写真方式の [発明の属する技術分野] 本発明は、周辺に各色毎の帯 **聞手段と画像書込み手段と現像手段とクリーニング装置** 画像を形成することができるカラー画像形成装置に関す カラー画像形成装置に関し、特に転写材の両面にカラー とを備えた像形成体の4組を中間転写体上に配置して、 上記像形成体上に形成したトナー像を転写材上に転写、

[0002]

号公報や同4-214576号公報等により、像形成体 **好のジャムや転写材のしむ等を引き起こすことのない両** 【従来の技術】従来、既写材搬送の信頼性があく、既写 数、同54-28140号公報、特開平1-44457 と中間転写体とを用いて転写材の両面にトナー像を形成 したのも、1回の定着で両面画像を得る画像形成装置が 面画像形成装置として、特公昭49-37583号公 **距案されている。**

線形成手段を複数組配置し、像形成体上に形成した重ね ートナー像を形成し、像形成体上のトナー像及び中間転 一像を定着して両面カラー画像を形成する画像形成装置 **帯電手段、画像書込み手段、現像手段等よりなるトナー** 合わせカラートナー像を一旦ベルト状の中間転写体に一 **恬して転写したのち、再度像形成体上に重ね合わせカラ** 形成体上のトナー像を按面画像として一括転写し、また 中間転写体上のトナー像を英面画像として一括転写した のち、中間転写体から転写材を分離し、転写材上のトナ 写体上のトナー像とタイミングを合わせて給送され、中 閲覧写体により撤送される転写材の両面にそれぞれ、像 [0003] また本願発明者らは、像形成体の周りに、

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や画像形成方法を特開平 9ー258492号公報や特開 **平9 - 258516号公報にて関示した。**

7、各色毎の像形成体、帯電手段、画像書込み手段、現 記各色毎の像形成体上に形成したカラートナー像を一旦 ペルト状の中間転写体に低ね合わせて転写して低ね合わ **セカラートナー像を形成したのち、上配重ね合わせカラ ートナー像にタイミングを合わせて、各色毎の像形成体** る、いわゆるタンデム型の両面カラー画像形成装置につ 上に再度カラートナー像を形成し、中間転写体上のトナ り搬送される転写材の安面には、再度形成した像形成体 た中間転写体上のトナー像を裏面画像として転写材の製 し、転写材上のトナー像を定着して両面カラー画像を得 **一像とタイミングを合わせて結送され、中間転写体によ** 像手段等よりなるトナー像形成手段を複数組配置し、。 [0004] さらに、ペルト状の中国航母体に対向し 上のトナー像を安面画像として低ね合わせて転写し、 面に一括転写したのち、中間転写体から転写材を分離 いても极致している。 2

[0000]

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[発明が解決しようとする騏靼] かかるタンデム型の画 像形成装置においては、画像形成速度が早くなるという 利点があるが、色毎のトナー像形成順序が一定に決まっ たいてダ更することはできない。 徐りた、既写材に簡写 された重ね合わせトナー像の安面画像と英面画像とでは は、カラー画像の色鯛が違ってしまうという問題点があ その重ね順が反転し、このため数面画像と裏面画像と

のできるカラー画像形成装置を提供することを目的とす [0006] 本発明は上記の問題点を解決し、教英のカ ラー画像の色調に差のない良好な画質の画像を得ること

[0007]

ロー、マゼンタ、シアン、思からなるカラートナー像の に形成されたトナー像を順次重ね合わせてカラー画像を 形成するカラー画像形成装置において、中間転写体を介 して転写材の両面にトナー像を形成するとともに、イエ エローとマゼンタであることを特徴とするカラー画像形 【課題を解決するための手段】上記目的は、像形成体上 **<u>1</u>**な合わせ順が、最初と最後がシアンと黒、その間がイ

ときのトナー付着虫は前配馬のトナー像が上層になると きのトナー付着量に比べ大にすることを特徴とする前配 【0008】なお、前記最後のトナー像が黒であること こ、その色補正を変更することを特徴とする前配カラー 画像形成装置。さらに、前配黒のトナー像が下層になる を特徴とする前記カラー画像形成装置。また、前配トナ 像は袋面画像であるか又は裏面画像であるかによっ カラー画像形成装置は好ましい実施閣様である。 成装置によって適成される。 6

[発明の実施の形態] 本発明の実権の形態の一倒かある [6000]

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一画像形成装置について説明する。 なお、以下の本発明 はない。また、以下の実施形態の説明において、転写域 において像形成体に対向する側の転写材の面を装面、転 写材の他方の面すなわち中間転写体に対向する側の転写 材の面を裏面といい、転写材の表面に転写する画像を教 両面にカラー画像を形成して定着を行うようにしたカラ の実施の形態の説明は、ペストモードを示すものであっ て、請求項の技術的範囲や用語の意義を限定するもので 面画像、転写材の裏面に転写する画像を裏面画像とい

図、図2 (C) は、転写材上への両面画像形成を示す図 説明する。図1は本発明にかかわるカラー画像形成装置 の一実첦形態を示すカラー画像形成装置の断面構成図や あり、図2は、本発明にかかわるカラー画像形成装置の は、彼形成体に形成したトナー像を中間骸甲体上に骸坪 し凝面画像を形成する図、図2 (B) は、中間転写体上 映樹形態の構成と作用について、図1及び図2を用いて **【0010】本発明にかかわろカラー画像形成装置の-**の最面画像と同期して像形成体に表面画像を形成する 西面のトナー像形成状態を示す図であり、図2(A)

【0011】図1において、本実炻形態で示すカラー画 (図示省略)、 画像形成部Dで構成され、 村記画像説取 り部Aが画像観取り手段に、画像データ処理部Bが画像 処理手段に、また、前記画像形成部Dが画像形成手段に 像形成装置は、画像観取り部A、画像データ処理部B

競取り部Aにおいて、原稿60は装面を上向きとして上 【0012】画像蓜取り部Aは原稿の両面又は片面 (表 側よりページ順に積陥されていて、核出ローラ51とさ ばきローラ52の作動により最上層の原稿60は1枚ず 面)に記録された画像説取りを可能とするもので、画像 **の頃次搬送路53に向け搬送される。**

【0013】搬出された原稿60は実線にて示す位置に 付勢されているガイド板61を排除して破線にて示す位 **置に退避させ、撤送ペルト54を介して透明体のプラテ** ンガラス55上に給紙されて、玻面を下向きにした状態 で原稿部取り位置に一時停止される。ガイド板61は原 稿60が通過後直ちに実験にて示す位置に戻る。

【0014】プラテンガラス55上の原稿60の装面画 像は、走査光学系を構成する照明ランプと第1ミラーか らなる第1ミテーユニット56と、V字状に位置した第 の、第1ミラーユニット56の速度Vによる航み取り動 **ナである樹像辮子CCDの受光面に結像される。色分離** 作と、第2ミラーユニット57による同方向への速度V /2による移動により甑み取られて、投影レンズ62と ダイクロイックプリズム 63を通して3個のラインセン して撥像栞子CCD上に結像したライン状の光学像は順 2ミラーと第3ミラーからなる第2ミラーユニット57 **水電気信号(輝度信号)に光電変換される。**

[0015] 画像説取り部Aでは装面画像の読み取りが 株了すると、原稿60は撥送ペルト54の一時的な逆回 転により反転給紙路58を経て投裏を反転し、再び搬送 路53を経て搬送ベルト54を介してプラテンガラス5 5上に給紙され、裏面を下向きにした状態で原稿競取り 位置に一時停止される。

を終了した原稿60は、搬送ペルト54の動作により排 **紙ローラ59を介してトレイ64上に装面が上向きの状** 【0016】プラテンガラス55上の原稿60は裏面画 像を前記の走査光学系によって観み取られ、色分離して 【0017】プラテンガラス55上での画像の観み取り 態で下側よりページ順に積み重なるように排紙される。 撮像業子CCDによって電気信号に光電変換される。

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像の画像信号(画像データ)は、後述する画像データ処 v 補正、数/裏画像の補正処理などの各種画像処理が施 [0018] 前配画像説取り部Aで説み取られた原稿画 理部Bにおいて、濃度変換、フィルタ処理、変倍処理、 されたのち、画像形成部Dに出力される。

[0019] 画像形成部Dにおいて、10は各色毎の像 形成体である感光体ドラム、11は各色毎の帯電手段で 段である靍光光学系、13は各色毎の現像手段である現 転写年段である裏面転写器、14hは転写材分離手段で ある紙分離AC除電器、15bは転写材供給手段である タイミングローラ、150は転写材帯電手段である紙帯 電器、160は拍車162を有する搬送手段である搬送 0 は中間転写体クリーニング手段であるトナー像受像体 あるスコロトロン帯電器、12は各色毎の画像曹込み手 **像器、14aは中間転写体であるトナー像受像体、14** c は各色毎の転写手段である転写器、14g は最面画像 部、17は定着手段である定着装置、19は各色毎の像 形成体クリーニング年段であるクリーニング装置、14 クリーニング装置である。 ន ణ

ラム10、各色毎のスコロトロン帯電器11、各色毎の 露光光学系12及び各色毎の現像器13は、これら1組 [0020] 本実施形態においては、各色毎の感光体ド として画像形成ユニット100を構成し、シアン

像受像体14aの回転方向に対して、形成される色と順 M, CあるいはK, M, Y, Cなど、最初と最後がシア ン(C)と畦(K)、その甌がイエロー(Y)とをゼン 序に従ってC, M, Y, Kの頃に配置される。ただし、 て、図1の矢印にて示す反時計方向に回転されるトナ-(K) の各色毎の画像形成ユニット100を4組設け この配列順は上記の他にC, Y, M, Kと、K, Y, (C) , マゼンタ (M) , イエロー (Y) , 及び黒 タ (M) であればよい。

(OPC) 等の感光層を形成したものであり、導電層を [0021] 像形成体である感光体ドラム10は、例え ば、アルミニウム材によって形成される円筒状の金属基 体の外周に、単電層、a-Si層あるいは有機感光層 **按地した状態で図1の矢印で示す時計方向に回転され**

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[0022] 各色毎の帯電手段であるスコロトロン帯電 とによって帯電作用(本実施形態においてはマイナス帯 器11は、それぞれ所定の電位に保持された制御グリッ ドとコロナ放電電極によるトナーと同極性のコロナ放電 題)を行い、感光体ドラム10に対し一様な電位を与え は、その他鋸歯状電極や針状電極を用いることも可能で る。スコロトロン帯電器11のコロナ放電電極として

[0023]各色毎の画像書込み手段である露光光学系 12は、感光体ドラム10上での露光位置が、前述した 各色毎のスコロトロン帯電器11に対して感光体ドラム 伝法体 (施品名:セルフォックワンズアワイ) とた権成 は、その他レーザ光学系を用いることも可能である。各 取られメモリに記憶された各色の画像データに従って感 10の回転方向下流側に位置するようにして感光体ドラ **配列された像露光光(画像雪込み光)の発光架子として** 並べた線状の露光葉子と、結像栞子としての光収束性光 色毎の露光光学系12は、画像説取り部Aによって説み 光体ドラム10の感光層を像露光し、各色毎の感光体ド は、戯光体ドラム10のドラム軸と平行に主走査方向に の例えばLED (発光ダイオード) を複数個アレイ状に ム10の周辺に配置される。各色毎の露光光学系12 される観光用ユニットである。観光光学系12として ラム10上に静電潜像を形成する。

より回転中に移動可能である。

 5~1mm、外径1.5~25mmの円筒状の非磁性 のステンレス倒めるいはアルミニウム材で形成された現 像スリーブ131を有し、内部に各色毎の現像色に従い 不図示の突き当てコロにより戯光体ドラム10と所定の 間隙、例えば100~500μmをあけて非接触に保た れており、現像スリーブ131に対し直流電圧と交流電 接触又は非接触の反転現像を行い、 感光体ドラム10上 シアン (C) 、イエロー (Y) 、マゼンタ (M) 、およ び黒(K)の1成分あるいは2成分の現像剤を収容して いる。それぞれの現像器13の現像スリーブ131は、 圧を宜畳した現像パイアス電圧を印加することにより、 ドラム10の回転方向と順方向に回転する例えば厚み の前記静電潜像をトナー像に顕像化する。

oた、2隔構成のシームレスベルトである。トナー**像**受 変性ポリイミド、熱硬化性ポリイミド、エチレンテトラ イロンアロイ特のエンジニアリングプラスチックに導転 は、体積抵抗率が10^{12~1015}0・cm、装面抵抗が フルオロエチレン共組合体、ポリフッ化ピニリデン、ナ 材料を分散した、厚さ0.1~1.0mmの半導電性フ ィルム基体の外側に、好ましくはトナーフィルミング防 止隔として厚さ5~50μmのフッ繋コーティングを行 1012~10150/cm2の無結ベルトであり、倒えば [0025] 中間転写体であるトナー像受像体14a

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像体14gの基体としては、この他に、シリコンゴムむ るいはウレタンゴム毎に導覧材料を分散した厚さ0.5 ~2. 0mmの半導電性ゴムベルトを使用することもで 帯翼2002-31933

に内接して張架され、図1の矢印で示す反時計方向に回 1、ガイドローラ14」の頃に散けられ、従動ローラ1 16、要面転写対向ローラ14k、駆動ローラ14d及 **びガイドローラ146、14jは固定して回転され、テ** ンションローラ14iはトナー像受像体14aの導力に 【0026】トナー像受像体14aは、駆動ローラ14 転される。トナー像受像体14gの回転方向に従い従助 ローラ14 e、展面転写対向ローラ14k、駆動ローラ d、従動ローラ14e、ガイドローラ14f、14j、 **要面転写対向ローラ14k及びテンションローラ14** i 14d、ガイドローラ14f、テンションローラ14 01

[0027] 不図示の駆動モータよりの駆動をうけて駆 駆動回転される。トナー像受像体14aの回転により従 動ローラ14e、ガイドローラ14f、14j、 最面転 **写対向ローラ14k及びテンションローラ14iが従動** 動ローラ14dが回転すると、トナー像受像体14aが 回転される。回転中のトナー像受像体143のペルト数 みがテンションローラ14iにより緊張される。 8

ナー像受像体14aを挟んで各色毎の膨光体ドラム10 と対向して設けられ、トナー像受像体14aと各色毎の する。各色毎の転写器14cにはトナーと反対極性 (本 低写板146に転写電界を形成することにより、各色毎 の戯光体ドラム10上のトナー像をトナー像受像体14 [0028]各色毎の転写手段である転写器14cはト 数光体ドラム10との間に各色毎の転写板14bを形成 実施形態においてはプラス極性)の直流電圧を印加し、 a 上又は転写材の数面に転写する。

> [0024]各色毎の現像手段である現像器13は、感 光体ドラム10の周面に対し所定の間隙を保ち、戯光体

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の直流電圧が印加され、トナー像受像体14a上に担持 148は、トナー像受像体14aを挟んで接地された導 される重ね合わせカラートナー像を一括して転写材の要 【0029】また、英面画像転写手段である要面転写器 配件の要面転写対向ローラ14kに対向して設けられ、 トナーと反対極性(本実施形態においてはプラス種性) 面に転写する。 【0030】駆動ローラ14dに対向して転写分離手段 である紙分離AC除電器14hが、また、ガイドローラ [0031] 転写材帯電手段である紙帯電路150はト e に対向して設けられ、支軸152を回転支点としてト ナー像受像体 1 4 a に当接及び当接解除可能であり、転 お紙帯電器150억盤関して設けたコロナ放電器であっ 14 fと対向し中間転写体クリーニング手段であるトナ ナー像受像体148を挟んで接地された従動ローラ14 早材を帯配してトナー像受像体14mに吸着させる。 一個受像体クリーニング装置140が設けられる。 8

[0032] 毎分離ACAC係電器14hは必要に応じて要 面転字器14gと並んでトナー像免像体14aの定着装 値17g域部にトナー像免像体14aを技人で破地され た単電性の駆動ローラ14右に対向して設けられ、トナーと同様性又は逆極性の直流電圧を重阻した交流電圧が、トナ 可加され、トナー像受像本14aにより概述される転写 材を修理する。転写材のトイ・像受像本14aにのの分 離は駆動ローラ14dの曲率分離あるいは駆動ローラ1 4dの曲率分離に紙分離石を行れる。

成される。

[0033] 搬送部160はトナー像受像体14aと定着装置17との間に設けられ、搬送部160の上面には拍車162が設けられる。拍車162は、転写材がトナー像受像体14aより分離される際にトナー像受像体14aより分離される際にトナー像受像体14a方向一曲がって搬送されようとする転写材をすくい上げると共に、裏面にトナー像を有する転写材を要面トナー像の乱れを妨止しながら定道装置17へと搬送す

[0034] 定着装置17は、内部にヒータを有する定巻ローラ17aと圧着ローラ17bとの2本のローラで続にされ、定省ローラ17aと圧着ローラ17bとの関係により、定発と圧力とを加えることにより転写材上のトナー像を

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[0035]中間衛写体クリーニング手段であるトナー線受像本クリーニング装置140は、トナー像受像体14aを挟んで定者装置17周のガイドローラ14 fに対向して設けられ、支粒142を回転支点としてトナー像受像体14aに当投及び当接解除可能なトナー像受像体2リーニングブレード141によりトナー像受像体14a上の衝写像トナーをクリーニングする。トナー像受像体クリーニングが超140は衝写体の造入側のガイドローラ14jと対向して設けることも可能である。

[0036] 次に両面画像形成プロセスについて説明する。画像記録のスタートがなされると、画像記録り部Aにおいて、撮像架子により読み取られた原格画像の画像データ、あるいはコンピュータで編集された画像の画像データは、後に説明する画像データ処理部別においてC(シアン)、M(マガング)、Y(イエロー)及びK(別)の各色別の画像信号として処理される。

【0037】画像記録のスタートにより不図示の感光体駆動モータの始動によりシアン(C)の画像形成ユニット100の感光体ドラム10が図1の矢印で示す時計方向へ回転され、同時にCのスコロトロン帯電路11の帯電店用によりCの感光体ドラム10に電位の付与が開始

【0038】Cの感光体ドラム10は電位を付与されたあと、Cの露光光学系12によって裏面画像についての第10色信号すなわちこの画像データに対応する電気信号による画像电込み(露光)が開始され、Cの感光体ドラム100安面の感光層に原稿画像のCの画像に対応する

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る静電階像が形成される。

【0039】前記の潜像はこの現像器13により接触または非透触の状態で反転現像され、この感光体ドラム10上にはその回転に応じてシアン(C)のトナー像が形

[0040]上記の画像形成プロセスによってCの感光体ドラム10上に形成された凝雨画像となるCのトナー像がCの矩写は14bにおいて、Cの哲写器14cによってトナー像受像体14a上に転写される。

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[0041]次いでマゼンタ (M) の画像形成ユニット100のMの感光体ドラム10は、Mのスコレトロン帯電器11の帯電作用により電位が付与され、トナー像受像体14a上のCのトナー像上局報が取られ、Mの32光学第12によって第2の価格等すなわちMの画像デーが、大力な電気信号による値像地交み (現光) が行われ、Mの現像器13による接触又は非接触の医転現像による、表現を立るでは、Mの底写成14 bにおいてMの底等314 cによってトナー像の集場14 a上に転写され、前記シア、(C)のトナー像の量かもた形成される。

おいて、Yの転写器14cによって、前記C, Mの重ね よりKの欧光体ドラム10上に形成された第4の色信号 【0042】同様のプロセスにより、前記C,Mの重ね 合わせトナー像と同期が取られ、イエロー (Y).の画像 形成ユニット100によりYの褻光体ドラム10上に形 成された、第3の色信号によるVの画像データに対応す **る要面画像となるYのトナー像が、Yの転写域14bに 合わせトナー像の上からYのトナー像が重ね合わせて形** 成され、さらに、そのC, M, Yの重ね合わせトナー像 と回越が取られ、旺 (K) の回線形成コニット100に によるKの画像データに対応する異面画像となるKのト 上に裏面画像のC, M, Y及びKの4色の重ね合わせカ ナー像が、Kの甑写板14bにおいて、Kの甑写器14 cによって、栏記C, M, Yのトナー像の上からKのト ナー像が重ね合わせて形成され、トナー像受像体14a ラートナー(像が形成される(図2(A))。

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【のの43】転写後の各色毎の優光体ドラム1のの周面上に残ったトナーは、感光体ドラムクリーニング手段であるクリーニング装置19に至り、優光体ドラム10に当後したゴム材から成るクリーニングプレード19aに

よってクリーニングされる。 「0044」以上のようにしてトナー像受像体14a上 に凝価回像となる紅わ台かせたカラートナー像が形成さ れたのち、引き続きトナー像受像体14aに招持されて、いる数面画像のカラートナー像との検証のとれて、 の回像形成コニット10によりこの数面画像となるこのトナー像が前配のカテー画像形成プロセスと同様にして のトナー像が前配のカラー画像形成プロセスと同様にして ての感光体ドラム10上に形成される。この際、Cの 総本体ドラム10上に形成される。この際、Cの 総本体ドラム10上に形成される。この際、Cの

Cの感光体ドラム10上に形成した裏面画像に対して鏡像となるように画像データが変更される。

に紙帯電を行うことにより、トナー像受像体14a上の 5シ状の紙帯電器150に代わりコロナ帯電器を用いて ローラ15 b~搬送され、タイミングローラ15 bの駅 動によって、Cの感光体ドラム10上に担存されたCの Cの転写域146~給送される。この際、記録紙Pに当 紙帯電器150により、記録紙Pがトナーと同極性に紙 符覧され、トナー像受像体14aに吸着されてCの転写 **嵌146~搬送される(図2(B))。トナーと同極性** トナー像やこの感光体ドラム10上のトナー像と引き合 [0045] Cの核光体ドラム10上へのCの牧面画像 形成にともなって転写材である記録紙Pが転写材収納手 により送り出され、転写材給送手段としてのタイミング 校面画像のトナー像と、トナー像受像体14aに担持さ れている裏面画像のカラートナー像との同期がとられて 接状態とされトナーと同極性(本実施形態においてはマ イナス極性)の直流電圧が印加された先端がブラン状の うことを防止して、トナー像の乱れを防止している。ブ 段である給紙カセット15より、送り出しローラ15a

[0046] Cの転写域14bではトナーと反対極性 (本実施形態においてはプラス極性)の電圧が印加されたCの転写器14cによってCの懸光体ドラム10上の数面回線が記録紙Pの数面に転写される。このとき、トナー像受像体14a上の英面画像は記録紙Pに転写されないでトナー像要像体14a上に存在する。

トナー像との同期が取られて、M, Y, Kそれぞれの画 性) の電圧が印加された各転写器14 cによって各感光 体14a上に存在する。C, M, Y, Kの感光体ドラム [0041] 回核にして、トナー像受像体14aに担持 されている英面画像のカラートナー像とこの牧面画像の 像形成ユニット100によりM, Y, Kの教面画像のト ナー像が感光体ドラム10上に形成され、M, Y, Kの bでトナーと反対極性(本実施形態においてはプラス極 像がM, Y, Kの順に記録紙Pの接面にCのトナー像の 10上に形成されるC, M, Y, Kの教面画像は、前記 C, M, Y, Kの戯光体ドラム10上に形成した要面画 数面画像のトナー像がM,Y,Kそれぞれの転写数14 本ドラム10上のM, Y, Kの表面画像のカラートナー 上に頃次転写される。このとき、トナー像受像体14g 上の裏面画像は記録紙Pに転写されないでトナー像受像 像に対しそれぞれ鋭像となるように画像データは変更さ

【のの48】 数面にカラートナー像が転写された配録紙Ptt、トナーと反対極性(本実施形態においてはプラス極性)の電圧を印加した裏面配写器14gへと搬送され、要面転写器14gんと搬送され、要面転写器14gによりトナー像受像体14aの周面上の裏面に転写される。

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【0049】また、紙帯電器150は配品紙Fの後端の通過の直前あるいは通過と同時にトナー偏受像体14aより当接解除され配給紙Fと離開される(図2

(C))。 新特電器15への程圧の印加は配砂紙Pの送られているときのみであり、配砂紙Pとの福間と回時に 新希電器150へ印加されている程圧は切断される。[0050] 回面にカラートナー像が簡単された記録

10 0 5 0 月 回面にガラードー保砂路やキュルに記載的では、次に駆動ローラ14 d の曲等分離あるいは必要に たじて曲等分離と併用して行われる転写材分離等段としての低分離 4 4 から分離され、拍車16 2 が設けられた 観光部16 0 を超て、配路装置17 へと搬送される。 定 看装置17において、配砂紙Pは定着ローラ17 a と圧 着ローラ17 b との間で繁と圧力とを加えるられること により配砂紙Pの装異面のトナー像が定着され、両面画 能配砂がなされた配砂紙Pは接数の画像が反応されて当 を記録がなされた配砂紙Pは装数の画像が反応されて当 を記録がなされた配砂紙Pは装数の画像が反応されて送 [0051]・転写後のトナー像受像体143の西面上に 残ったトナーは、トナー像受像体143を挟んでガイドローラ14 に対向して数けられた、支軸142を回転支点としてトナー像受像体143に当接及び当接解解可能でトナー像受像体143に当接状態とされるトナー像吸像体クリーニング表面140のトナー像受像体クリーニングが15・141によりクリーニングされる。

【のの52】また、転写後の各色毎の感光体ドラム10の周面上に残ったトナーは、クリーニング装置19のクリーニングブレード19aにより残留トナーを除せされ、不図示の若包前の一様露光器により先の画像形成による感光体ドラム10上の履歴が解消されて、次の画像

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形成サイクルにはいる。 【0053】上記の西面偏形成装置では、上述の実施 形態で説明したような艦事材の両面に画像を形成する両 面画像形成の他に、転写材の数面又は要面のみの片側に 画像を形成する片側画像形成もなされ場ることはが触て ある。 【0054】ここで、前配画像餅取り餌A、画像データ 処理部B、画像形成部Dからなる上記のカテー画像形成 装置の回路構成を、図3及び図4のプロック図に従って 取明する。 [0055]先ず、画像館取り部Aにおいて、前配の盤像乗子CCDから出力される色分離した3色のアナログ画像信号は、A/D変換器B11によってディジタル画像信号(画像データ)に変換されて、インターフェイスB12を介して画像データ処理部Bに出力される。

[0056] 國線データ処理部Bに入力されたディンタル回線信号 (国政信号) は、先ず、遊政政数B13によって選択指数に政策される。

【0057】そして、使用者の変倍指定に従った変倍や 理が、拡大・絡小処理B14で行われる。また、画像判

別処理B15においては、前配濃度変換B13で変換さ ルタ特性を設定し、フィルタ処理B 1 6 では、前記設定 数判別結果に基づいてフィルタ処理 B 16 におけるフィ れた猿度情報に基づいて文字画・写真画の判別を行い、 に従って空間フィルタ処理を行う。

形態における画像判別手段及び処理特性可変手段に相当 し、文字画・写真画の判別は文字画と写真画との混在画 【0058】なお、前配画像判別処理B15が、本実施 像における文字画像領域、写真画像領域の判別を含むも 2

時の画像に見られる網点画のモアレを防止するために行 [0059] ここで、村大・橋小の指定に応じて、フィ 前記フィルタ処理と変倍処理との入れ換えは、縮小処理 ルタ処理と変倍処理とを入れ換えて行わせるために、一 **対のデータセレクタB17,B18が散けられている。**

ない画像処理系のCPUは、前配ヒストグラムデータに 基づいて適正なッ補正データをy補正処理B20に提供 プリスキャンで得られた画像情報から原稿画像の特徴を 得るために、ヒストグラムデータを得る。そして図示し 【0060】一方、EE処理B19は、本スキャン前の

一夕(撥度情報)は、前記γ補正処理B20で後述する 画像形成装置 B 2 5 の特性に応じたγ補正が超されたの 【0061】フィルタ処理・変倍処理が恼された画像テ ち、画像領域処理B21に出力される。前配画像領域処 理B21では、原稿の有効画像領域の抽出の他、枠消 し、折り目消しなどの徴域加工も行う。

画像処理が施され、後述する画像形成装置B25への最 【0062】上記のようにして画像形成に必要な全ての を行う機能と共に、入力された画像データを画像記憶部 B23において複数配箇保持しておき、核配憶された画 2と、補正された画像データより画像形成を行わせる機 **| は出力状態となった画像データ(濃度情報)は、インタ** 【0063】画像形成部口においては、原稿の館取りに 対してリアルタイムに感光体ドラム10上への画像形成 像データを後から任意に既み出すデータセレクタB91 と、我/풪に対応して画像補正を行う画像補正処理B9 **ーフェイスB22を介して画像形成部Dに出力される。**

[0064] ここで、本実施形態では、上記のように原 稿画像を読み取って得られ、然も、必要な画像処理が全 て施された画像データを保存しておき、核保存された画 象データを後から選択的に読み出して画像形成を行わせ る機能を電子RDH機能と称するものとする。

とができる。

版りを行うためのデータセレクタB91と数/嚢に対応 機能とを切り換えかつ要面及び要面の画像データの割り した画像補正を行う画像補正処理B92とが設けられて 【0066】 前記データセレクタB91は、画像記憶部 B23から航み出された画像データと、画像データ処理 部日から読み取りに応じて逐次出力される画像データの いずれむー方を踏択的に画像形成装置(フーザプリン タ)B25に出力するものである。

タとは、画像形成装置B25において同等に扱われて画 【0067】すなわち、前配画像配ϐ部B23には、通 常にリアルタイム処理を行わせるときと同じ最終出力状 態の画像データが記憶され、前記データセレクタB91 によって選択的に出力される画像データ処理部Bからの 画像データと画像配燈部B23から節み出した画像デー 象形成が行えるようになっている。

面画像に比べ裏面画像は画像濃度が低くなる。また裏面 画像では2回の転写によるトナー像の散りにより路閾性 が変化する。さらにカラー画像ではトナー像の重なり合 るので表面と英面とで色調が変化する。Y, M, C3色 ては最上層となるK(黒)が強調され過ぎる傾向がある ので、按面画像と英面画像とでは色再現に当たってUC 【0068】本発明の画像形成装置では、裏面画像は像 形成体からトナー像受像体への転写及びトナー像受像体 から転写材への2回の転写が行われる。一方、安面画像 は像形成体から転写材への1回の転写が行われる。これ らの転写に蘇しては1回に10%程度のトナー付着量が **低下することにより、同条件で画像処理を行うときは接** わせの順序が、図5に示すように転写材上で反転してい の混合比からUGR量が求められるが、数面画像にあっ R歯を変化させ、或いはK成分を裏面に較べすくなくす ることが必要となる。 ន

【0069】また、カラー現像剤のトナーのシアン

(C) 、マゼンタ (M) 、イエロー (Y) の理想的な分 が、実際の代数的なトナーの分光反射率は図6に示すよ 光反射率は図7に示す特性を有することが必要である

に近い。従って、黒 (K) とツアン (C) とを重ね合わ [0070] シアン (C) トナーは特にカラーバランス **が悪く緑色倒域に不要な吸収特性を有して明度が低く**開 される4色の最初と最後に重ね合わすようにすることに より、両面画像形成時の要面画像と裏面画像とでトナー の重なり順序が反転することによる影響を少なくするこ

ング部でマスキング・最入れ・UCR等の色処理を含ん で行われる。マスキングとしては一般に行われる線形マ キングやルックアップテーブルを用いたマスキングが用 画像補正処理B92の色処理B921において、マスキ スキングあるいは高度な色補正を行う際には非線形マス [0071] 本実施形態においては図4に示すように、

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方、前記電子RDH機能と通常のリアルタイム画像形成

果現するため、画像データを書き換え可能に記憶する画

【0065】画像形成恕Dには、ワー声プリンタなどか ある画像形成装置B25の他に、前記電子RDH機能を 像記憶部B23 (画像データ記憶手段) が設けられる一

タは按面画像と英面画像に対してそれぞれの予め設定し ておき、表面か英面かに応じてパラメータの設定変更が **行われる。このような色処理とγ変換及びフィルタ処理** が色処理B921とγ変換及びフィルタ処理B922に おいて行われ、スクリーン角、ディザや緊急拡散等の多 いられる。この色補正のためのマスキング用のパラメー 直化処理B923を経て、画像形成装置B25のC,

だけれたのち、画像濃度や色調が敷った両面画像の形 成が行われる。 英面画像は2回の転写工程を行うことか 【0072】また、モノクロ画像の時は色補正は不要で あるし、裏面画像に対してのみγ補正、フィルタ処理と このような画像補正処理が画像補正処理部B92におい ら、ッが按面画像に対して高くなり易く、解像度も低下 M, Y, K各色の露光光学系12への出力が行われる。 し易い。これを補正する機能をも有する。

腺度補正を行えばよく、黒(K)の最大濃度が飽和画像 寮度であれば、ヶ補正とフィルタ処理のみについてパラ メータの設定変更を行えば要異での差異の認められない **声面画像が得られることとなる。**

[0073]また、前記説明においては画像データの錦 なっているが、鏡像変換処理を画像補正処理B92にお ける数面が最面かに応じて設定変更するパラメータの中 象変換処理はデータセレクタB91において行う構成と に含めた回路構成とすることも可能である。

(Y) トナーを加えることで色の耐久性を高め、文字等 の再現性を向上させるからである。3色トナーからグレ [0074] 前述のように、カラー画像形成にはシアン (C) 、マゼンタ (M) 、イエロー (Y) の3色のトナ は高濃度部での濃度補充によりシャドー部での再現性を - 成分をとり除き期(K)トナーと置き換える操作を下 色除去、又はUCRと呼ぶ。通常UCRとしては100 -の他に駐(K)トナーを加えるのが一般である。これ **も上し、カラートナーの消費盘を減らし、少量の黒**

(K) トナーが最上層になる場合に比ぐ淡く見えること になる。従って、黒(K)トナーが最下層になる場合に 【0075】シアン (C) トナーが最上層になり、黒 は期(K)のトナー付着量を大にするか、又はUCR (K) トナーが最下層になる場合はKトナーはMトナ -、YトナーあるいはCトナーに覆われるので、黒

[0076] 画像形成の色の順序はC, M, Y, Kの順 M, C, C, Y, M, KあるいはK, M, Y, Cと、 要 に行われる。ただし、この順序は上記の他にK, Y, (下色除去)を大きくする調整が行われる。

年限2002-31933

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するに最初と最後がシアン(C)と黒(K)、その関が イエロー (Y) とマゼンタ (M) であればよい。 [0077] <u>級</u>股の**苑**い眠 (K) 単色ホードプリントの ことを先えるとKの画像形成ユニット100はトナー像 受像体14aの機送方向の最下流に配置するのがプリン ト速度が早くなるので好ましい。

ない極めて良好な画質を得ることの可能なカラー画像形 るとぎは、Kの画像形成ユニット100はトナー像母像 体14aの搬送方向の最下流に配置されるので単色黒ブ [発明の効果] 本発明によるときは、両面にカラートナ 画像形成装置において、要要のカラー画像の色鬩に蓋の 成装置が提供されることとなった。また、請求項 2によ --像を保持した転写材を一括定着するタンデム型カラ--リント時のプリント速度を早くする効果が生じる。 |図画の簡単な説明| 9

[図1] 本発明の画像形成装置の一例を示す断面構成図 a もか。 【図2】トナー像形成状態と転写材の供給を示す説明図 **さある。**

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図3】本発明に用いられる回路の一例を示すプロック 図である。

[図4] 図3の画像補正処理の詳細を示すプロック図で

[図5] 転写材の安英における各色トナーの角なり順を 示す説明図である。 [図6] 実用されるカラートナーそれぞれの分光反射卒 **抽線を示すグラフである** 図7】理想的なカラートナーそれぞれの分光反射率曲 線を示すグラフである。

[你号の説明]

0 数光体ドラム(破形成体) スコロトロン特配路

以光光光光

%以下が用いられる。

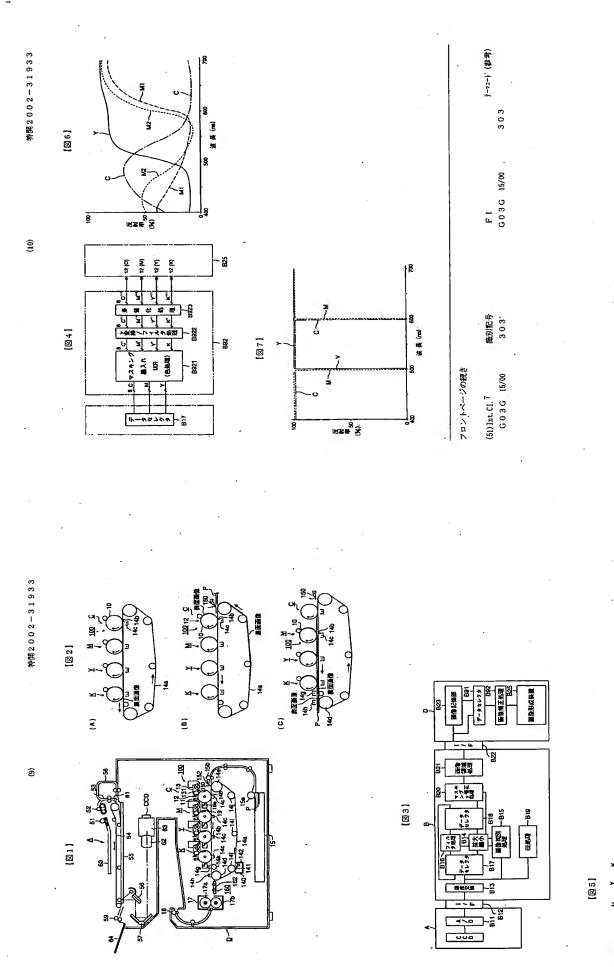
4 3 トナー(象型像体(中間転写体) 4 c 転写器

14g 英面転写器

14h 紙分離AC除配器 17 定着装置

画像データ処理部 画像院取り部

固像形成恕



PATENT ABSTRACTS OF JAPAN

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(21)Application number: 2000-215752

(71)Applicant: KONICA CORP

(22)Date of filing:

17.07.2000

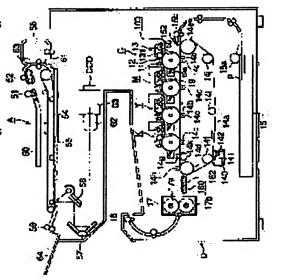
(72)Inventor: HANEDA SATORU

(54) COLOR IMAGE FORMING DEVICE

PROBLEM TO BE SOLVED: To obtain high image

(57)Abstract:

quality free from a tone difference between color images formed on front and rear sides, as for a tandem color image forming device for fixing a transfer material with color toner images on both sides in a mass. SOLUTION: As for the color image forming device for sequentially superposing toner images respectively formed on photosensitive drums 10 for respective colors (C, Y, M and K) functioning as an image forming body, the toner image is formed on the rear side of a recording paper P as a transfer material via a toner image receptor 14a as an intermediate transfer body, and also, as for the order of superposing color toner images, that is, cyan, yellow, magenta and black toner images, the cyan image is the first order and the black image is the last order, and the yellow image and the



LEGAL STATUS

[Date of request for examination]

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magenta image come between them in order.

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[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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[JP,2002-031933,A]
CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS
[Translation done.]

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CLAIMS

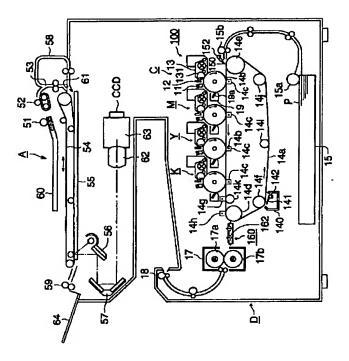
[Claim(s)]

[Claim 1] Color picture formation equipment with which the beginning and the last are characterized by for the order of superposition of the color toner image which consists of yellow, a Magenta, cyanogen, and black to be [for cyanogen, black, and the meantime] yellow and a Magenta in the color picture formation equipment which is made to pile up each other's toner image formed on the image formation object one by one, and forms a color picture while forming a toner image in both sides of imprint material through a middle imprint object.
[Claim 2] Color picture formation equipment according to claim 1 characterized by the toner image of the aforementioned last being black.

[Claim 3] It is color picture formation equipment according to claim 1 or 2 characterized by changing the color correction by whether the aforementioned toner image is a surface picture formed in the front face of the aforementioned imprint material, or it is the rear-face picture formed in the rear face of the aforementioned imprint material.

[Claim 4] Toner coating weight in case the toner image of the aforementioned black becomes a lower layer is color picture formation equipment according to claim 3 characterized by making it size compared with toner coating weight in case the toner image of the aforementioned black becomes the upper layer.

Drawing selection [Repr s ntativ drawing]



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[JP,2002-031933,A]
CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS
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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[The technical field to which invention belongs] this invention arranges 4 sets of the image-formation object equipped with the electrification means, the picture write-in means, the development means, and the cleaning equipment for every color on the outskirts on a middle imprint object, and relates to the color-picture formation equipment which can form a color picture especially in both sides of imprint material about the color-picture formation equipment of electrophotography methods, such as the copying machine which imprints the toner image formed on the above-mentioned image-formation object on imprint material, and is established, a printer, and FAX.

[0002]

[Description of the Prior Art] Conventionally, the reliability of imprint material conveyance is high and the image formation equipment which acquires a double-sided picture by one fixing with JP,49-37583,B, a 54-28740 official report, JP,1-44457,A, a 4-214576 official report, etc. after forming a toner image in both sides of imprint material, using an image formation object and a middle imprint object as double-sided image formation equipment which causes neither the jam of imprint material nor the wrinkling of imprint material is proposed. [0003] Invention-in-this-application persons around an image formation object Moreover, an electrification means, a picture write-in means, Once [which has arranged two or more sets of toner image formation meanses which consist of a development means etc., and was formed on the image formation object] piling up and imprinting a color toner image collectively on a belt-like middle imprint object, Pile up on an image formation object again and form a color toner image, and double the toner image on an image formation object and the toner image on a middle imprint object, and timing, and it is fed. A package imprint is carried out using the toner image on an image formation object as a surface picture at both sides of the imprint material conveyed with a middle imprint object, respectively. Moreover, by making the toner image on a middle imprint object into a rear-face picture, after carrying out a package imprint, imprint material is separated from a middle imprint object. Image formation equipment and the image formation method which are established in the toner image on imprint material, and form a double-sided color picture were indicated in JP,9-258492,A or JP,9-258516,A. [0004] A belt-like middle imprint object is countered. Furthermore, the image formation object for every color, an electrification means, Two or more sets of toner image formation meanses which consist of a picture write-in means, a development means, etc. are arranged. After once piling up, imprinting and laying the color toner image formed on the image formation object for every above-mentioned color on top of a belt-like middle imprint object and forming a color toner image, Double timing with the above-mentioned superposition color toner image, and a color toner image is again formed on the image formation object for every color. In the front face of the imprint material with which doubles the toner image and timing on a middle imprint

object, and it is fed and which is conveyed with a middle imprint object Pile up the toner image on the image formation object formed again as a surface picture, and it is imprinted. Moreover, after carrying out a package imprint at the rear face of imprint material by making the toner image on a middle imprint object into a rear-face picture, it has proposed also about the double-sided color picture formation equipment of the so-called tandem die which separates imprint material from a middle imprint object, is established in the toner image on imprint material, and obtains a double-sided color picture.

[0005]

[Problem(s) to be Solved by the Invention] In the image formation equipment of this tandem die, although there is an advantage that image formation speed becomes early, the toner image formation sequence for every color was decided uniformly, and it cannot change. Therefore, it piled up, and by the surface picture and rear—face picture of a toner image, the order of a pile was reversed and, for this reason, the surface picture and the rear—face picture had the trouble imprinted by imprint material that the color tone of a color picture will be different.

[0006] this invention solves the above—mentioned trouble and it aims at offering the color picture formation equipment which can acquire the picture of the good quality of image which does not have a difference in the color tone of the color picture of the front reverse side.

[Means for Solving the Problem] In the color picture formation equipment which is made to pile up each other's toner image formed on the image formation object one by one, and forms a color picture, while the above-mentioned purpose forms a toner image in both sides of imprint material through a middle imprint object The order of superposition of the color toner image which consists of yellow, a Magenta, cyanogen, and black is attained for the beginning and the last by cyanogen, black, and the color picture formation equipment with which the meantime is characterized by being yellow and a Magenta.

[0008] In addition, the aforementioned color picture formation equipment characterized by the toner image of the aforementioned last being black. Moreover, it is the aforementioned color picture formation equipment characterized by changing the color correction by whether the aforementioned toner image is a surface picture or it is a rear—face picture. Furthermore, the aforementioned color picture formation equipment characterized by making toner coating weight in case the toner image of the aforementioned black becomes a lower layer into size compared with toner coating weight in case the toner image of the aforementioned black becomes the upper layer is a desirable embodiment.

[0009]

[Embodiments of the Invention] The color picture formation equipment which was made to be fixed to both sides which are examples of the gestalt of operation of this invention by forming a color picture is explained. In addition, explanation of the gestalt of operation of the following this inventions does not show the best mode, and limits neither the technical range of a claim, nor a terminological meaning. Moreover, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters an image formation object in an imprint region is called rear face, and the picture which imprints the picture imprinted on the front face of imprint material at the rear face of a surface picture and imprint material is called rear—face picture.

[0010] The composition and the operation of color picture formation equipment of 1 operation gestalt in connection with this invention are explained using <u>drawing 1</u> and <u>drawing 2</u>. Drawing 1 is the cross-section block diagram of the color picture formation equipment in which 1 operation gestalt of the color picture formation equipment in connection with this invention is shown. <u>drawing 2</u> It is drawing showing the toner image formation state of both sides of the color picture formation equipment in connection with this invention. drawing 2 (A) Drawing where drawing which imprints the toner image formed in the image formation object on a middle

imprint object, and forms a rear-face picture, and <u>drawing 2</u> (B) form a surface picture in an image formation object synchronizing with the rear-face picture on a middle imprint object, and <u>drawing 2</u> (C) are drawings showing the double-sided image formation to an imprint material top.

[0011] In <u>drawing 1</u>, the color picture formation equipment shown with this operation form consists of picture read station A, the image-data-processing section B (illustration abbreviation), and the image formation section D, the image-data-processing section B is equivalent to an image-processing means, and the aforementioned image formation section D is equivalent to an image formation means for the aforementioned picture read station A at a picture read means.

[0012] Picture read station A makes possible picture read recorded on both sides or one side (front face) of a manuscript, in picture read station A, the laminating of the manuscript 60 is carried out to the order of a page from the bottom by making a front face into facing up, it sells with the taking-out roller 51, and one manuscript 60 of the best layer is conveyed at a time towards the conveyance way 53 one by one by the operation of a roller 52.

[0013] It is made to evacuate to the position which eliminates the guide plate 61 energized by the position shown as a solid line, and is shown with a dashed line, and paper is fed to the taken-out manuscript 60 on the platen glass 55 of the transparent body through the conveyance belt 54, and it stops to a manuscript reading station in the state where the front face was placed upside down. A guide plate 61 returns to the position immediately shown as a solid line after a manuscript's 60 passing.

[0014] The surface picture of the manuscript 60 on platen glass 55 The 1st mirror unit 56 which consists of a lighting lamp which constitutes scanning optical system, and the 1st mirror, Reading operation by the speed V of the 1st mirror unit 56 of the 2nd mirror unit 57 which consists of the 2nd mirror located in the shape of V character, and the 3rd mirror, It is read by movement by speed V / 2 to this direction by the 2nd mirror unit 57, and image formation is carried out to the light-receiving side of the image pck-up element CCD which are three line sensors through the projection lens 62 and a dichroic prism 63. Photo electric translation of the optical image of the shape of a line which carried out color separation and which carried out image formation on the image pck-up element CCD is carried out to an electrical signal (luminance signal) one by one.

[0015] At picture read station A, after reading of a surface picture is completed, a manuscript 60 reverses the front reverse side through the reversal feeding way 58 by temporary inverse rotation of the conveyance belt 54, and paper is again fed to it on platen glass 55 through the conveyance belt 54 through the conveyance way 53, and it stops to a manuscript reading station in the state where the rear face was placed upside down.

[0016] With the aforementioned scanning optical system, the manuscript 60 on platen glass 55 is read, carries out color separation of the rear—face picture, and photo electric translation is carried out to an electrical signal by the image pck—up element CCD.

[0017] Paper is delivered to the manuscript 60 which ended reading of the picture on platen glass 55 so that a front face may be piled up in order of [bottom] a page in the upward state on a tray 64 through the delivery roller 59 by operation of the conveyance belt 54.

[0018] In the image-data-processing section B mentioned later, the picture signal (image data) of the manuscript picture read by the aforementioned picture read station A is outputted to the image formation section D, after various image processings, such as concentration conversion, filtering, variable power processing, gamma amendment, and amendment processing of a table / back picture, are performed.

[0019] The photo conductor drum whose 10 is an image formation object for every color in the image formation section D, The scorotron electrification machine whose 11 is an electrification means for every color, the exposure optical system whose 12 is a picture write-in means for every color, The development counter whose 13 is a development means for every color, the

toner image television object whose 14a is a middle imprint object, The imprint machine whose 14c is an imprint means for every color, the rear-face imprint machine whose 14g is a rear-face picture imprint means, The paper separation AC electric discharge machine whose 14h is an imprint material separation means, the timing roller whose 15b is an imprint material supply means, The paper electrification machine whose 150 is an imprint material electrification means, the conveyance section which is a conveyance means by which 160 has a spur 162, The fixing equipment whose 17 is a fixing means, the cleaning equipment whose 19 is an image formation object cleaning means for every color, and 140 are toner image television object cleaning equipment which is middle imprint object cleaning meanses.

[0020] In this operation gestalt the photo conductor drum 10 for every color, the scorotron electrification machine 11 for every color, the exposure optical system 12 for every color, and the development counter 13 for every color The image formation unit 100 is constituted as these 1 sets. Cyanogen (C), A Magenta (M), yellow (Y), and 4 sets of image formation units 100 for every black (K) color are formed, and it is arranged in order of C, M, Y, and K according to the color and sequence which are formed to the hand of cut of toner image television object 14a which rotates to the counterclockwise rotation shown by the arrow of drawing 1. However, C, Y, M, K, and the beginnings, such as K, Y, M, C, or K, M, Y, C, and the last other than the above [this order of an array] should just be [cyanogen (C) black (K) and the meantime] yellow (Y) and a Magenta (M).

[0021] The photo conductor drum 10 which is an image formation object forms photosensitive layers, such as a conductive layer, an a-Si layer, or an organic photosensitive layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow of <u>drawing 1</u> where a conductive layer is grounded.

[0022] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means for every color performs the electrization (it sets in this operation gestalt and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this. [0023] The exposure optical system 12 which is a picture write-in means for every color is arranged around the photo conductor drum 10, as the exposure position on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 for every color is a unit for exposure which consists of optical convergency optical-transmission objects (tradename : selfoc-lens array) as the exposure element and image formation element of the line which arranged two or more Light Emitting Diodes (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light (picture write-in light) arranged by parallel at main scanning direction in the shape of an array. As exposure optical system 12, it is also possible to, use a laser beam study system in addition to this. The exposure optical system 12 for every color carries out image exposure of the photosensitive layer of the photo conductor drum 10 according to the image data of each color which was read by picture read station A and memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color. [0024] The development counter 13 which is a development means for every color maintains a predetermined gap to the peripheral surface of the photo conductor drum 10. The thickness of 0.5-1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10, It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15-25mm, and the developer of cyanogen (C), yellow (Y), a Magenta (M) and one black (K) component, or two components is held in the interior according to the development color for every color.

Un-illustrating dashes the development sleeve 131 of each development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100-500 micrometers, by the koro, is maintained at non-contact, by impressing the development bias voltage which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs contact or non-contact reversal development, and develops the aforementioned electrostatic latent image on the photo conductor drum 10 in a toner image. [0025] A volume resistivity toner image television object 14a which is a middle imprint object 1012 - 1015 ohm-cm, Surface electrical resistance is the endless belt of the 1012 - 1015 ohm/cm 2. For example, a denaturation polyimide, A thermosetting polyimide, an ethylene tetrafluoroethylene copolymer, a polyvinylidene fluoride, Distributed the electrical conducting material to engineering plastics, such as a nylon alloy. It is the seamless belt of the two-layer composition which performed fluorine coating with a thickness of 5-50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1-1.0mm as a toner filming prevention layer preferably. If it considers as the base of toner image television object 14a, a half-conductivity rubber belt with a thickness of 0.5-2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber. [0026] Toner image television object 14a is inscribed in and laid [firmly] across drive roller 14d and follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow of drawing 1 . According to the hand of cut of toner image television object 14a, it is prepared in order of follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d, guide-idler 14f, tension roller 14i, and guide-idler 14j, and it can fix and rotate and tension roller 14i can move follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d and guide idlers 14f and 14j during rotation by the elasticity of toner image television object 14a. [0027] If drive roller 14d rotates in response to a drive [drive motor / non-illustrated], drive rotation of the toner image television object 14a will be carried out. Follower rotation of follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and the tension roller 14i is carried out by rotation of toner image television object 14a. The belt slack of toner image television object 14a under rotation becomes it tense by tension roller 14i. [0028] On both sides of toner image television object 14a, imprint machine 14c which is an imprint means for every color counters with the photo conductor drum 10 for every color, is prepared, and forms imprint region 14b for every color between toner image television object 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and

imprint means for every color counters with the photo conductor drum 10 for every color, is prepared, and forms imprint region 14b for every color between toner image television object 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a toner image television object 14a top or the front face of imprint material.

[0029] Moreover, it is prepared in conductive rear-face imprint opposite roller 14k grounded on both sides of toner image television object 14a face to face, polar (it sets in this operation form and is plus polarity) direct current voltage opposite to a toner is impressed, and 14g of rear-face imprint machines which are a rear-face picture imprint means bundles up the superposition color toner image supported on toner image television object 14a, and they imprint it at the rear face of imprint material.

[0030] Drive roller 14d is countered, 14h of paper separation AC electric discharge machines which are an imprint separation means counters with guide-idler 14f again, and the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means is formed.

[0031] The paper electrification machine 150 which is an imprint material electrification means is countered and formed in follower roller 14e grounded on both sides of toner image television object 14a, contact and contact release are possible for it to toner image television object 14a, is charged in imprint material, and is made to stick to toner image television object 14a by using

a pivot 152 as the rotation supporting point. In addition, the paper electrification machine 150 may be a corona discharge machine estranged and formed.

[0032] Conductive drive roller 14d grounded by the fixing equipment 17 side-edge section of toner image television object 14a on both sides of toner image television object 14a together with 14g of rear-face imprint machines if needed is countered, it is prepared, the alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and 14h of paper separation AC electric-discharge machines discharges the imprint material conveyed by toner image television object 14a. Separation from toner image television object 14a of imprint material is performed to curvature separation of drive roller 14d, or curvature separation of drive roller 14d by using together an electric discharge operation of 14h of paper separation AC electric discharge machines.

[0033] The conveyance section 160 is formed between toner image television object 14a and fixing equipment 17, and a spur 162 is formed in the upper surface of the conveyance section 160. A spur 162 conveys the imprint material which has a toner image at the rear face to fixing equipment 17, preventing disorder of a rear-face toner image while dipping up the imprint material which is going to be conveyed by bending in the direction of toner image television object 14a, in case imprint material is separated from toner image television object 14a. [0034] Fixing equipment 17 consists of two rollers of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, and is established in the toner image on imprint material by applying heat and a pressure between fixing roller 17a and sticking-by-pressure roller 17b. [0035] On both sides of toner image television object 14a, the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means counters guide-idler 14f by the side of fixing equipment 17, is formed, and cleans the transfer residual toner on toner image television object 14a to toner image television object 14a by using a pivot 142 as the rotation supporting point by the toner image television object cleaning blade 141 in which contact and contact release are possible. It counters with guide-idler 14j by the side of penetration of imprint material, and toner image television object cleaning equipment 140 can also be prepared.

[0036] Next, a double-sided image formation process is explained. If the start of image recording is made, in picture read station A, the image data of the manuscript picture read by the image pck-up element or the image data of the picture edited by computer will be processed in the image-data-processing section B explained later as a picture signal according to each color of C (cyanogen), M (Magenta), Y (yellow), and K (black).

[0037] It rotates to the clockwise rotation which the photo conductor drum 10 of the image formation unit 100 of cyanogen (C) shows by the arrow of <u>drawing 1</u> by starting of the photo conductor drive motor which is not illustrated by the start of image recording, and grant of potential is simultaneously started by the photo conductor drum 10 of C by electrification operation of the scorotron electrification machine 11 of C.

[0038] After potential is given to the photo conductor drum 10 of C, the picture writing (exposure) by the 1st chrominance signal about a rear–face picture, i.e., the electrical signal corresponding to the image data of C, is started by the exposure optical system 12 of C, and the electrostatic latent image corresponding to the picture of C of a manuscript picture is formed in the photosensitive layer of the front face of the photo conductor drum 10 of C. [0039] Reversal development of the aforementioned latent image is carried out in the state of [non–contact] contact by the development counter 13 of C, and the toner image of cyanogen (C) is formed according to the rotation on the photo conductor drum 10 of C.

[0040] The toner image of C used as the rear-face picture formed on the photo conductor drum 10 of C of the above-mentioned image formation process is imprinted by imprint machine 14c of C on toner image television object 14a in imprint region 14b of C.

[0041] Subsequently, the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) Potential is given by electrification operation of the scorotron electrification

machine 11 of M, and the toner image of C on toner image television object 14a and a synchronization are taken. The picture writing (exposure) by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of M, is performed by the exposure optical system 12 of M, and the toner image of the Magenta (M) which serves as a rear–face picture by the contact or the non–contact reversal development by the development counter 13 of M is formed. The toner image of this M is imprinted by imprint machine 14c of M on toner image television object 14a in imprint region 14b of M, and the toner image of the upper shell M of the toner image of the aforementioned cyanogen (C) piles up, and is formed.

[0042] According to the same process, the superposition toner image of Above C and M and a synchronization are taken. The toner image of Y used as the rear-face picture corresponding to the image data of Y by the 3rd chrominance signal formed on the photo conductor drum 10 of Y of the image formation unit 100 of yellow (Y) sets to imprint region 14b of Y. Of imprint machine 14c of Y, the toner image of the upper shell Y of the superposition toner image of Above C and M piles up, and is formed. Furthermore, the toner image of K used as the rear-face picture corresponding to the image data of K by the 4th chrominance signal which the superposition toner image of C, M, and Y and synchronization were taken, and was formed on the photo conductor drum 10 of K of the black (K) image formation unit 100 In imprint region 14b of K, of imprint machine 14c of K, the toner image of the upper shell K of the toner image of Above C, M, and Y piles up, and is formed, and the superposition color toner image of four colors of C, M, Y, and K of a rear-face picture is formed on toner image television object 14a (drawing 2 (A)). [0043] The toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint results in the cleaning equipment 19 which is a photo conductor drum cleaning means, and is cleaned by cleaning-blade 19a which consists of the rubber material which contacted the photo conductor drum 10.

[0044] After the piled-up color toner image which turns into a rear-face picture on toner image television object 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face picture currently succeedingly supported by toner image television object 14a is taken, and the toner image of C which turns into a surface picture of C by the image formation unit 100 of C is formed on the photo conductor drum 10 of C like the aforementioned color picture formation process. Under the present circumstances, image data is changed so that the surface picture of C formed on the photo conductor drum 10 of C may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C.

[0045] In connection with the surface image formation of C to the photo conductor drum 10 top of C, from the feed cassette 15 whose recording paper P which is imprint material is an imprint material receipt means It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. by the drive of timing roller 15b The synchronization with the toner image of the surface picture of C supported on the photo conductor drum 10 of C and the color toner image of the rear-face picture currently supported by toner image television object 14a is taken, and imprint region 14b of C is fed. Under the present circumstances, paper electrification of the recording paper P is carried out at a toner and like-pole nature, toner image television object 14a is adsorbed by the brush-like paper electrification machine 150, and the nose of cam where it considered as the contact state and the direct current voltage of a toner and like-pole nature (it sets in this operation form and is minus polarity) was impressed to the recording paper P is conveyed with it to imprint region 14b of C (drawing 2 (B)). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on toner image television object 14a, or the toner image on the photo conductor drum 10 of C, and disorder of a toner image is prevented. Instead of the brush-like paper electrification machine 150, you may use a corona-electrical-charging machine.

[0046] In imprint region 14b of C, the surface picture on the photo conductor drum 10 of C is imprinted by imprint machine 14c of C to which polar (it sets in this operation form and is plus

polarity) voltage opposite to a toner was impressed on the front face of the recording paper P. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting.

[0047] Similarly the synchronization with the color toner image of a rear—face picture and the toner image of the surface picture of C which are supported by toner image television object 14a is taken. The toner image of the surface picture of M, Y, and K is formed on the photo conductor drum 10 of each image formation unit 100. M, Y, and K — the toner image of the surface picture of M, Y, and K — M, Y, and K — each imprint region 14b — a toner and opposite polarity (in this operation form) The color toner image of the surface picture of M, Y, and K on each photo conductor drum 10 is imprinted one by one on the front face of the recording paper P in order of M, Y, and K by each imprint machine 14c to which the voltage of ** plus polarity was impressed at the toner image top of C. At this time, the rear—face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting. Image data is changed so that the surface picture of C, M, Y, and K which are formed on the photo conductor drum 10 of C, M, Y, and K may turn into a mirror image to the rear—face picture formed on the photo conductor drum 10 of Above C, M, Y, and K, respectively.

[0048] The recording paper P with which the color toner image was imprinted by the front face is conveyed at 14g of rear-face imprint machines which impressed polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner, and the color toner image of the rear-face picture on the peripheral surface of toner image television object 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P.

[0049] Moreover, simultaneously with passage just before passage of the back end of the recording paper P, from toner image television object 14a, contact release is carried out and the paper electrification machine 150 is estranged with the recording paper P (drawing 2 (C)). Impression of the voltage to the paper electrification machine 15 is only a time of the recording paper P being sent, and the voltage currently impressed simultaneously with alienation with the recording paper P to the paper electrification machine 150 is disconnected.

[0050] The electric-discharge operation of 14h of paper separation AC electric-discharge machines as an imprint material separation means performed by next using together with curvature separation drive roller 14d if needed [curvature separation or if needed] dissociates from toner image television object 14a, and the recording paper P with which the color toner image was imprinted by both sides is conveyed through the conveyance section 160 in which the spur 162 was formed to fixing equipment 17. ****** to which the recording paper P applies heat and a pressure in fixing equipment 17 between fixing roller 17a and sticking-by-pressure roller 17b — things are fixed to the toner image on the rear face of front of the recording paper P, the picture of the front reverse side is reversed and sent and the recording paper P with which double-sided image recording was made is discharged with the delivery roller 18 to the tray of the equipment exterior

[0051] The toner which remained on the peripheral surface of toner image television object 14a after an imprint uses as the rotation supporting point the pivot 142 which countered guide-idler 14f and was prepared on both sides of toner image television object 14a, and the contact and the contact release to toner image television object 14 a are possible for it, and it is cleaned by the toner image television object cleaning blade 141 of the toner image television object cleaning equipment 140 made into a contact state at toner image television object 14a.
[0052] Moreover, cleaning-blade 19a of cleaning equipment 19 removes a remains toner, the history on the photo conductor drum 10 by previous image formation is canceled by the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle.

[0053] Of course, also do single-sided image formation which forms a picture in one side of only the front face of imprint material, or a rear face other than the double-sided image formation which forms a picture in both sides of imprint material which was explained with the above-mentioned operation gestalt with above double-sided image formation equipment. [0054] Here, the circuitry of the above color picture formation equipment which consists of aforementioned picture read station A, the image-data-processing section B, and the image formation section D is explained according to the block diagram of drawing 3 and drawing 4. [0055] First, in picture read station A, the analog picture signal of three colors which are outputted from the aforementioned image pck-up element CCD and which carried out color separation is changed into a digital image signal (image data) by A/D converter B11, and is outputted to the image-data-processing section B through an interface B12.

[0056] The digital image signal (luminance signal) inputted into the image-data-processing section B is first changed into concentration information by the concentration conversion B13. [0057] And variable power processing according to variable power specification of a user is performed by the enlarging-or-contracting processing B14. Moreover, in the picture distinction processing B15, character drawing and photograph drawing are distinguished based on the concentration information changed by the aforementioned concentration conversion B13, the filter shape in filtering B16 is set up based on this distinction result, and spatial filter processing is performed by filtering B16 according to the aforementioned setup.

[0058] In addition, the aforementioned picture distinction processing B15 shall be equivalent to the picture distinction means and processing property adjustable means in this operation form, and distinction of character drawing and photograph drawing shall include distinction of the character picture field in the mixture picture of character drawing and photograph drawing, and a photograph field.

[0059] Here, in order to replace filtering and variable power processing and to make them perform according to specification of enlarging or contracting, the data selectors B17 and B18 of a couple are formed. The exchange with the aforementioned filtering and variable power processing is performed in order to prevent the moire of the half-tone-dot drawing looked at by the picture at the time of reduction processing.

[0060] On the other hand, the EE processing B19 obtains histogram data, in order to acquire the feature of a manuscript picture from the image information obtained by the preece can in front of this scan. And CPU of the image-processing system which is not illustrated provides gamma amendment processing B20 with proper gamma amendment data based on the aforementioned histogram data.

[0061] The image data (concentration information) to which filtering and variable power processing were performed is outputted to the picture field processing B21, after gamma amendment according to the property of the image formation equipment B25 later mentioned by the aforementioned gamma amendment processing B20 is given, the aforementioned picture field processing B21 — others [extraction / of the effective picture field of a manuscript] — ****(ing) — ******(ing) — etc. — field processing is also performed

[0062] The image data (concentration information) which changed into the final output state to the image formation equipment B25 which all image processings required for image formation are performed as mentioned above, and is mentioned later is outputted to the image formation section D through an interface B22.

[0063] In the image formation section D, with the function to carry out image formation to the photo conductor drum 10 top to real time to the read of a manuscript The data selector B91 which reads the image data which carries out two or more storage maintenance of the inputted image data in the picture storage section B23, and was this memorized afterwards to arbitration, It has the picture amendment processing B92 in which picture amendment is performed corresponding to a table/reverse side, and the function to make image formation perform from the amended image data.

[0064] Here, with this operation form, the function to read alternatively from after the image data which a manuscript picture is read as mentioned above, it is obtained, and ** also saves the image data to which all required image processings were performed, and was this saved, and to make image formation perform shall be called an electronic RDH function. [0065] In order to realize the aforementioned electronic RDH function other than the image formation equipment B25 which is a LASER beam printer etc. in the image formation section D, While the picture storage section B23 (image data storage means) memorized possible [rewriting of image data] is formed The data selector B91 for switching the aforementioned electronic RDH function and the usual real-time image formation function, and assigning the image data of a front face and a rear face and the picture amendment processing B92 in which picture amendment corresponding to a table/reverse side is performed are formed. [0066] The aforementioned data selector B91 outputs alternatively the image data read from the picture storage section B23, or the image data serially outputted according to reading from the image-data-processing section B to image formation equipment (LASER beam printer) B25. [0067] Namely, the image data from the image-data-processing section B which the image data of the same final output state as the time of making a real-time operation perform to usual is memorized, and is alternatively outputted by the aforementioned data selector B91, and the image data read from the picture storage section B23 are equally treated by the aforementioned picture storage section B23 in image formation equipment B25, and can perform image formation now in it.

[0068] With the image formation equipment of this invention, as for a rear-face picture, the imprint to a toner image television object from an image formation object and two imprints to imprint material from a toner image television object are performed. On the other hand, as for a surface picture, one imprint to imprint material from an image formation object is performed. When about 10% of toner coating weight falls at once on the occasion of these imprints, and performing an image processing on these conditions, compared with a surface picture, as for a rear-face picture, picture concentration becomes low. Moreover, gradation nature changes with the expulsion of the toner image by two imprints by the rear-face picture. Furthermore, by the color picture, a toner image laps, and since the sequence of doubling is reversed on imprint material as shown in drawing 5, a color tone changes with a front face and the rear face. Although the amount of UCR(s) is calculated from the mixing ratio of Y, M, and C3 color, since there is an inclination for K (black) used as the best layer to be emphasized too much if it is in a surface picture, the thing which the amount of UCR(s) is changed in a color reproduction, or like K component compared with a rear face and to abolish is needed by the surface picture and the rear-face picture.

[0069] Moreover, although the cyanogen (C) of the toner of a color developer, a Magenta (M), and the ideal spectral reflectance of yellow (Y) need to have the property shown in drawing 7, the spectral reflectance of an actual typical toner has a property as shown in drawing 6. [0070] Especially a color-balance has a bad absorption property unnecessary to a green field, and a cyanogen (C) toner has lightness low close to black. Therefore, influence by the stacking-order foreword of a toner being reversed by the surface picture and rear-face picture at the time of double-sided image formation can be lessened by making it put on black (K), the beginning of four colors which pile up cyanogen (C), and the last.

[0071] As this operation form is shown in <u>drawing 4</u>, in the color processing B921 of the picture amendment processing B92, it is carried out including color processing of masking and inking, UCR, etc. in the masking section. In case alignment masking or the advanced color correction generally performed as masking is performed, nonlinear masking and masking which used the look-up table are used. Each sets up beforehand the parameter for masking for this color correction to the surface picture and the rear-face picture, and a setting change of a parameter is made according to a front face or a rear face. Such color processing, gamma conversion, and filtering are performed in the color processing B921, gamma conversion, and filtering B922, and

10/11

the output to C, M and Y of image formation equipment B25, and the exposure optical system 12 of K each color is performed through the multiple-value-ized processing B923 of a screen angle, a dither, error diffusion, etc. After such picture amendment processing is performed in the picture amendment processing section B92, formation of the double-sided picture in which picture concentration and the color tone were ready is performed. Since a rear-face picture performs 2 times of imprint processes, gamma tends to become high to a surface picture, and resolution also tends to fall. It also has an amendment function for this.

[0072] Moreover, if the black (K) maximum concentration is saturation picture concentration and a setting change of a parameter will be made only about gamma amendment and filtering that what is necessary is for the color correction to be unnecessary at the time of a monochrome picture, and to perform gamma amendment, and filtering and concentration amendment only to a rear—face picture, the double—sided picture the difference in the front reverse side is not accepted to be will be acquired.

[0073] Moreover, although mirror image transform processing of image data has composition performed in a data selector B91 in the aforementioned explanation, it is also possible to make mirror image transform processing into the circuitry included into the parameter which makes a setting change according to the front face or rear face in the picture amendment processing B92.

[0074] As mentioned above, it is general to add the black (K) toner other than the toner of three colors of cyanogen (C), a Magenta (M), and yellow (Y) to color picture formation. It is because this improves the repeatability in the shadow section by concentration supplement in the high concentration section, the consumption of a color toner is cut down, the endurance of a color is raised by adding a little black (Y) toner and repeatability, such as a character, is raised. The operation which takes and removes a gray component from 3 color toner, and is replaced with a black (K) toner is called lower color removal or UCR. Usually, 100% or less is used as UCR.

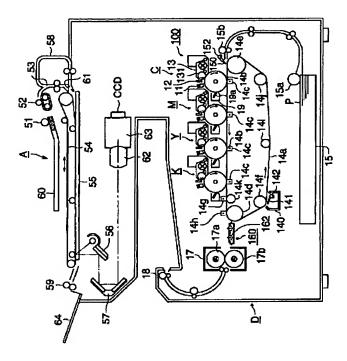
[0075] Since K toner is covered by M toner, Y toner, or C toner when a cyanogen (C) toner becomes the best layer and a black (K) toner becomes the lowest layer, compared with the case where a black (K) toner becomes the best layer, it will look palely. Therefore, when a black (K) toner becomes the lowest layer, adjustment which makes black (K) toner coating weight size, or enlarges UCR (lower color removal) is performed.

[0076] Sequence of the color of image formation is performed in order of C, M, Y, and K. However, in short, the beginning and the last other than the above [this sequence] should just be [cyanogen (C) black (K), and the meantime] yellow (Y) and a Magenta (M) with K, Y, M, C, C, Y, M, K, or K, M, Y and C.

[0077] Since it becomes early to arrange in the style of [of the conveyance direction of toner image television object 14a] the lowest, its print speed is [the image formation unit 100 of K] desirable [considering the thing of (Black K) monochrome mode print with high frequency,]. [0078]

[Effect of the Invention] When based on this invention, in the tandem—die color picture formation equipment which carries out package fixing of the imprint material which held the color toner image to both sides, the possible color picture formation equipment of obtaining the very good quality of image which does not have a difference in the color tone of the color picture of the front reverse side will be offered. Moreover, when based on a claim 2, since the image formation unit 100 of K is arranged in the style of [of the conveyance direction of toner image television object 14a] the lowest, the effect which carries out print speed at the time of a monochrome black print early produces it.

Drawing selection [Representative drawing]



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[JP,2002-031933,A]
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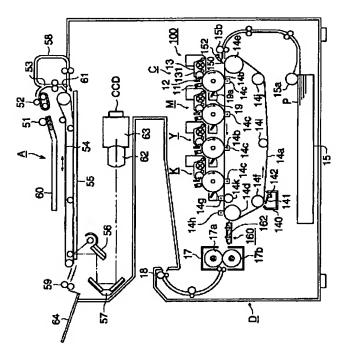
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TECHNICAL FIELD

[The technical field to which invention belongs] this invention arranges 4 sets of the image formation object equipped with the electrification means, the picture write-in means, the development means, and cleaning equipment for every color on the outskirts on a middle imprint object. It is related with the color picture formation equipment which can form a color picture especially in both sides of imprint material about the color picture formation equipment of electrophotography methods, such as a copying machine which imprints the toner image formed on the above-mentioned image formation object on imprint material, and is established, a printer, and FAX.

Drawing selection [Representative drawing]



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JAPANESE [JP,2002-031933,A]
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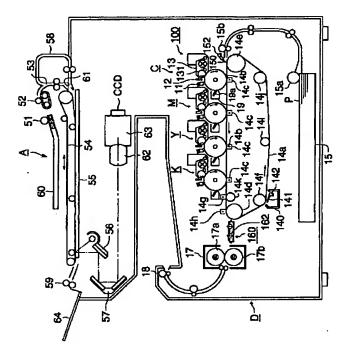
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PRIOR ART

[Description of the Prior Art] As the double-sided image formation equipment which the reliability of imprint material conveyance is high and causes neither the jam of imprint material, nor the wrinkling of imprint material conventionally The image formation equipment which acquires a double-sided picture by one fixing with JP,49-37583,B, a 54-28740 official report, JP,1-44457,A, a 4-214576 official report, etc. after forming a toner image in both sides of imprint material using an image formation object and a middle imprint object is proposed. [0003] Moreover, invention-in-this-application persons are an electrification means and a picture write-in means to the surroundings of an image formation object. Once [which has arranged two or more sets of toner image formation meanses which consist of a development means etc., and was formed on the image formation object] piling up and imprinting a color toner image collectively on a belt-like middle imprint object, Pile up on an image formation object again and form a color toner image, and double the toner image on an image formation object and the toner image on a middle imprint object, and timing, and it is fed. A package imprint is carried out using the toner image on an image formation object as a surface picture at both sides of the imprint material conveyed with a middle imprint object, respectively. Moreover, by making the toner image on a middle imprint object into a rear-face picture, after carrying out a package imprint, imprint material is separated from a middle imprint object. Image formation equipment and the image formation method which are established in the toner image on imprint material, and form a double-sided color picture were indicated in JP,9-258492,A or JP,9-258516,A.

[0004] A belt-like middle imprint object is countered. Furthermore, the image formation object for every color, an electrification means, Two or more sets of toner image formation meanses which consist of a picture write-in means, a development means, etc. are arranged. After once piling up, imprinting and laying the color toner image formed on the image formation object for every above-mentioned color on top of a belt-like middle imprint object and forming a color toner image, Timing is doubled with the above-mentioned superposition color toner image, and a color toner image is again formed on the image formation object for every color, and the toner image and timing on a middle imprint object are doubled, and it is fed, and is a middle imprint object. Pile up the toner image on the image formation object again formed in the front face of the imprint material conveyed as a surface picture, and it is imprinted. Moreover, after carrying out a package imprint at the rear face of imprint material by making the toner image on a middle imprint object into a rear-face picture, it has proposed also about the double-sided color picture formation equipment of the so-called tandem die which separates imprint material from a middle imprint object, is established in the toner image on imprint material, and obtains a double-sided color picture.

Drawing selection [Repr sentative drawing]



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JAPANESE [JP,2002-031933,A]

<u>CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS</u>

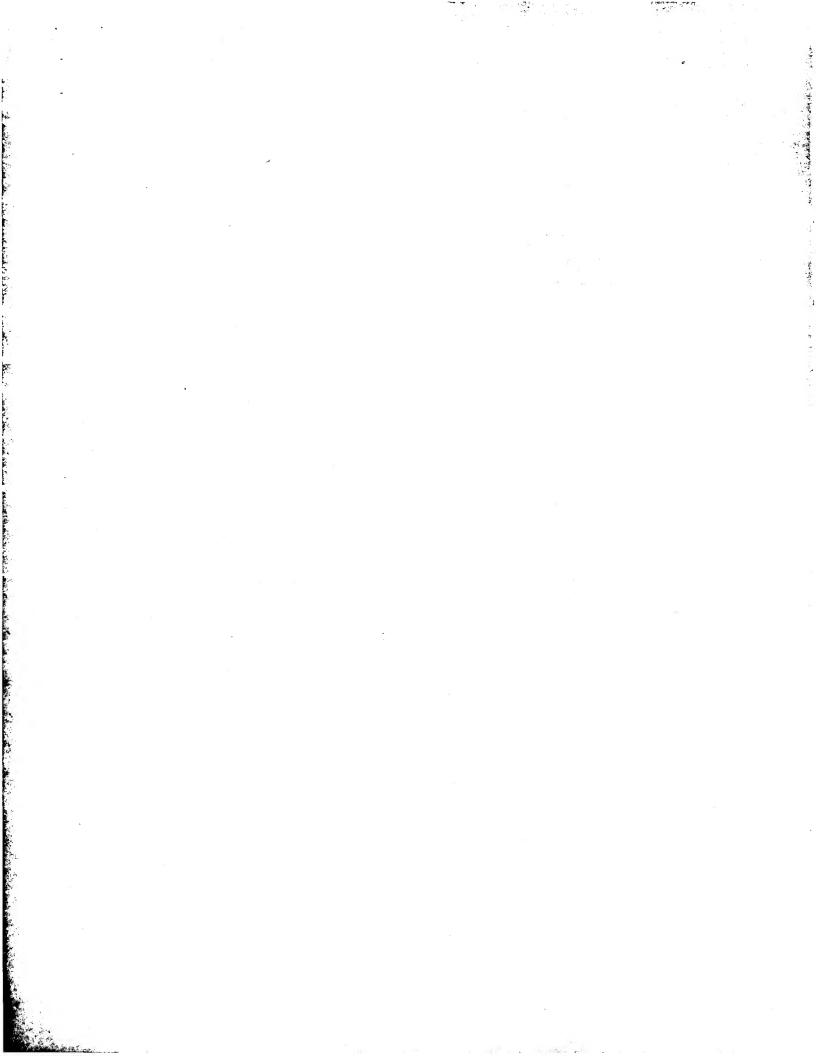
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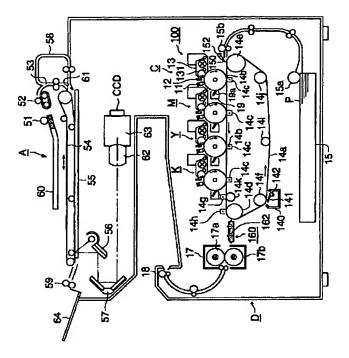
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EFFECT OF THE INVENTION

[Effect of the Invention] When based on this invention, in the tandem—die color picture formation equipment which carries out package fixing of the imprint material which held the color toner image to both sides, the possible color picture formation equipment of obtaining the very good quality of image which does not have a difference in the color tone of the color picture of the front reverse side will be offered. Moreover, when based on a claim 2, since the image formation unit 100 of K is arranged in the style of [of the conveyance direction of toner image television object 14a] the lowest, the effect which carries out print speed at the time of a monochrome black print early produces it.



Drawing selection [Representative drawing]



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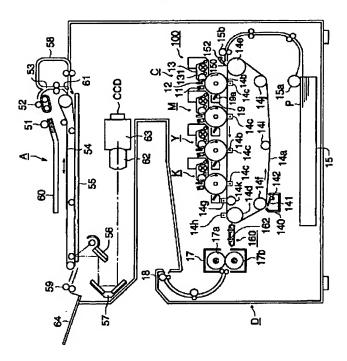
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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the image formation equipment of this tandem die, although there is an advantage that image formation speed becomes early, the toner image formation sequence for every color was decided uniformly, and it cannot change. Therefore, it piled up, and by the surface picture and rear—face picture of a toner image, the order of a pile was reversed and, for this reason, the surface picture and the rear—face picture had the trouble imprinted by imprint material that the color tone of a color picture will be different.

[0006] this invention solves the above—mentioned trouble and it aims at offering the color picture formation equipment which can acquire the picture of the good quality of image which does not have a difference in the color tone of the color picture of the front reverse side.

Drawing selection [Representative drawing]



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MEANS

[Means for Solving the Problem] In the color picture formation equipment which is made to pile up each other's toner image formed on the image formation object one by one, and forms a color picture, while the above-mentioned purpose forms a toner image in both sides of imprint material through a middle imprint object The order of superposition of the color toner image which consists of yellow, a Magenta, cyanogen, and black is attained for the beginning and the last by cyanogen, black, and the color picture formation equipment with which the meantime is characterized by being yellow and a Magenta.

[0008] In addition, the aforementioned color picture formation equipment characterized by the toner image of the aforementioned last being black. Moreover, it is the aforementioned color picture formation equipment characterized by changing the color correction by whether the aforementioned toner image is a surface picture or it is a rear–face picture. Furthermore, the aforementioned color picture formation equipment characterized by making toner coating weight in case the toner image of the aforementioned black becomes a lower layer into size compared with toner coating weight in case the toner image of the aforementioned black becomes the upper layer is a desirable embodiment.

[0009]

[Embodiments of the Invention] The color picture formation equipment which was made to be fixed to both sides which are examples of the gestalt of operation of this invention by forming a color picture is explained. In addition, explanation of the gestalt of operation of the following this inventions does not show the best mode, and limits neither the technical range of a claim, nor a terminological meaning. Moreover, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters an image formation object in an imprint region is called rear face, and the picture which imprints the picture imprinted on the front face of imprint material at the rear face of a surface picture and imprint material is called rear—face picture.

[0010] The composition and the operation of color picture formation equipment of 1 operation gestalt in connection with this invention are explained using <u>drawing 1</u> and <u>drawing 2</u>. Drawing 1 is the cross-section block diagram of the color picture formation equipment in which 1 operation gestalt of the color picture formation equipment in connection with this invention is shown. <u>drawing 2</u> It is drawing showing the toner image formation state of both sides of the color picture formation equipment in connection with this invention. drawing 2 (A) Drawing where drawing which imprints the toner image formed in the image formation object on a middle imprint object, and forms a rear-face picture, and <u>drawing 2</u> (B) form a surface picture in an image formation object synchronizing with the rear-face picture on a middle imprint object, and <u>drawing 2</u> (C) are drawings showing the double-sided image formation to an imprint material top.

[0011] In drawing 1, the color picture formation equipment shown with this operation gestalt

consists of picture read station A, the image-data-processing section B (illustration ellipsis), and the image formation section D, the image-data-processing section B is equivalent to an image-processing means, and the aforementioned image formation section D is equivalent to an image formation means for the aforementioned picture read station A at a picture read means. [0012] Picture read station A makes possible picture read recorded on both sides or one side (front face) of a manuscript, in picture read station A, the laminating of the manuscript 60 is carried out to the order of a page from the bottom by making a front face into facing up, it sells with the taking-out roller 51, and one manuscript 60 of the best layer is conveyed at a time towards the conveyance way 53 one by one by the operation of a roller 52.

[0013] It is made to evacuate to the position which eliminates the guide plate 61 energized by the position shown as a solid line, and is shown with a dashed line, and paper is fed to the taken-out manuscript 60 on the platen glass 55 of the transparent body through the conveyance belt 54, and it stops to a manuscript reading station in the state where the front face was placed upside down. A guide plate 61 returns to the position immediately shown as a solid line after a manuscript's 60 passing.

[0014] The surface picture of the manuscript 60 on platen glass 55 The 1st mirror unit 56 which consists of a lighting lamp which constitutes scanning optical system, and the 1st mirror, Reading operation by the speed V of the 1st mirror unit 56 of the 2nd mirror unit 57 which consists of the 2nd mirror located in the shape of V character, and the 3rd mirror, It is read by movement by speed V / 2 to this direction by the 2nd mirror unit 57, and image formation is carried out to the light-receiving side of the image pck-up element CCD which are three line sensors through the projection lens 62 and a dichroic prism 63. Photo electric translation of the optical image of the shape of a line which carried out color separation and which carried out image formation on the image pck-up element CCD is carried out to an electrical signal (luminance signal) one by one.

[0015] At picture read station A, after reading of a surface picture is completed, a manuscript 60 reverses the front reverse side through the reversal feeding way 58 by temporary inverse rotation of the conveyance belt 54, and paper is again fed to it on platen glass 55 through the conveyance belt 54 through the conveyance way 53, and it stops to a manuscript reading station in the state where the rear face was placed upside down.

[0016] With the aforementioned scanning optical system, the manuscript 60 on platen glass 55 is read, carries out color separation of the rear-face picture, and photo electric translation is carried out to an electrical signal by the image pck-up element CCD.

[0017] Paper is delivered to the manuscript 60 which ended reading of the picture on platen glass 55 so that a front face may be piled up in order of [bottom] a page in the upward state on a tray 64 through the delivery roller 59 by operation of the conveyance belt 54.

[0018] In the image-data-processing section B mentioned later, the picture signal (image data) of the manuscript picture read by the aforementioned picture read station A is outputted to the image formation section D, after various image processings, such as concentration conversion, filtering, variable power processing, gamma amendment, and amendment processing of a table / back picture, are performed.

[0019] The photo conductor drum whose 10 is an image formation object for every color in the image formation section D, The scorotron electrification machine whose 11 is an electrification means for every color, the exposure optical system whose 12 is a picture write-in means for every color, The development counter whose 13 is a development means for every color, the toner image television object whose 14a is a middle imprint object, The imprint machine whose 14c is an imprint means for every color, the rear-face imprint machine whose 14g is a rear-face picture imprint means, The paper separation AC electric discharge machine whose 14h is an imprint material separation means, the timing roller whose 15b is an imprint material supply means, The paper electrification machine whose 150 is an imprint material electrification means, the conveyance section which is a conveyance means by which 160 has a spur 162, The fixing

equipment whose 17 is a fixing means, the cleaning equipment whose 19 is an image formation object cleaning means for every color, and 140 are toner image television object cleaning equipment which is middle imprint object cleaning meanses.

[0020] In this operation gestalt the photo conductor drum 10 for every color, the scorotron electrification machine 11 for every color, the exposure optical system 12 for every color, and the development counter 13 for every color The image formation unit 100 is constituted as these 1 sets. Cyanogen (C), A Magenta (M), yellow (Y), and 4 sets of image formation units 100 for every black (K) color are formed, and it is arranged in order of C, M, Y, and K according to the color and sequence which are formed to the hand of cut of toner image television object 14a which rotates to the counterclockwise rotation shown by the arrow of drawing 1. However, C, Y, M, K, and the beginnings, such as K, Y, M, C, or K, M, Y, C, and the last other than the above [this order of an array] should just be [cyanogen (C) black (K) and the meantime] yellow (Y) and a Magenta (M).

[0021] The photo conductor drum 10 which is an image formation object forms photosensitive layers, such as a conductive layer, an a-Si layer, or an organic photosensitive layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow of <u>drawing 1</u> where a conductive layer is grounded.

[0022] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means for every color performs an electrification operation (it sets in this operation form and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this.

[0023] The exposure optical system 12 which is a picture write-in means for every color is arranged around the photo conductor drum 10, as the exposure position on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 for every color is a unit for exposure which consists of optical convergency optical-transmission objects (tradename : selfoc-lens array) as the exposure element and image formation element of the line which arranged two or more Light Emitting Diodes (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light (picture write-in light) arranged by parallel at main scanning direction in the shape of an array. As exposure optical system 12, it is also possible to, use a laser beam study system in addition to this. The exposure optical system 12 for every color carries out image exposure of the photosensitive layer of the photo conductor drum 10 according to the image data of each color which was read by picture read station A and memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color. [0024] The development counter 13 which is a development means for every color maintains a predetermined gap to the peripheral surface of the photo conductor drum 10. The thickness of 0.5-1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10, It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15-25mm, and the developer of cyanogen (C), yellow (Y), a Magenta (M) and one black (K) component, or two components is held in the interior according to the development color for every color. Un-illustrating dashes the development sleeve 131 of each development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100-500 micrometers, by KORO, is maintained at non-contact, by impressing the development bias voltage which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs contact or non-contact reversal development, and develops the aforementioned

electrostatic latent image on the photo conductor drum 10 in a toner image.

[0025] A volume resistivity toner image television object 14a which is a middle imprint object 1012 – 1015 ohm–cm, Surface electrical resistance is the endless belt of the 1012 – 1015 ohm/cm 2. For example, a denaturation polyimide, A thermosetting polyimide, an ethylene tetrafluoroethylene copolymer, a polyvinylidene fluoride, Distributed the electrical conducting material to engineering plastics, such as a nylon alloy. It is the seamless belt of the two–layer composition which performed fluorine coating with a thickness of 5–50 micrometers on the outside of a half–conductivity film base with a thickness of 0.1–1.0mm as a toner filming prevention layer preferably. If it considers as the base of toner image television object 14a, a half–conductivity rubber belt with a thickness of 0.5–2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber.

[0026] Toner image television object 14a is inscribed in and laid [firmly] across drive roller 14d and follower roller 14e, guide idlers 14f and 14j, rear—face imprint opposite roller 14k, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow of <u>drawing 1</u>. According to the hand of cut of toner image television object 14a, it is prepared in order of

According to the hand of cut of toner image television object 14a, it is prepared in order of follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d, guide-idler 14f, tension roller 14i, and guide-idler 14j, and it can fix and rotate and tension roller 14i can move follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d and guide idlers 14f and 14j during rotation by the elasticity of toner image television object 14a.

[0027] If drive roller 14d rotates in response to a drive [drive motor / non-illustrated], drive rotation of the toner image television object 14a will be carried out. Follower rotation of follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and the tension roller 14i is carried out by rotation of toner image television object 14a. The belt slack of toner image television object 14a under rotation becomes it tense by tension roller 14i.

[0028] On both sides of toner image television object 14a, imprint machine 14c which is an imprint means for every color counters with the photo conductor drum 10 for every color, is prepared, and forms imprint region 14b for every color between toner image television object 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a toner image television object 14a top or the front face of imprint material.

[0029] Moreover, it is prepared in conductive rear-face imprint opposite roller 14k grounded on both sides of toner image television object 14a face to face, polar (it sets in this operation gestalt and it is plus polarity) direct current voltage opposite to a toner is impressed, and 14g of rear-face imprint machines which are a rear-face picture imprint means bundles up the superposition color toner image supported on toner image television object 14a, and they imprint it at the rear face of imprint material.

[0030] Drive roller 14d is countered, 14h of paper separation AC electric discharge machines which are an imprint separation means counters with guide-idler 14f again, and the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means is formed.

[0031] The paper electrification machine 150 which is an imprint material electrification means is countered and formed in follower roller 14e grounded on both sides of toner image television object 14a, contact and contact release are possible for it to toner image television object 14a, is charged in imprint material, and is made to stick to toner image television object 14a by using a pivot 152 as the rotation supporting point. In addition, the paper electrification machine 150 may be a corona discharge machine estranged and formed.

[0032] Conductive drive roller 14d grounded by the fixing equipment 17 side-edge section of toner image television object 14a on both sides of toner image television object 14a together with 14g of rear-face imprint machines if needed is countered, it is prepared, the alternating

voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and 14h of paper separation AC electric-discharge machines discharges the imprint material conveyed by toner image television object 14a. Separation from toner image television object 14a of imprint material is performed to curvature separation of drive roller 14d, or curvature separation of drive roller 14d by using together an electric discharge operation of 14h of paper separation AC electric discharge machines.

[0033] The conveyance section 160 is formed between toner image television object 14a and fixing equipment 17, and a spur 162 is formed in the upper surface of the conveyance section 160. A spur 162 conveys the imprint material which has a toner image at the rear face to fixing equipment 17, preventing disorder of a rear-face toner image while dipping up the imprint material which is going to be conveyed by bending in the direction of toner image television object 14a, in case imprint material is separated from toner image television object 14a. [0034] Fixing equipment 17 consists of two rollers of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, and is established in the toner image on imprint material by applying heat and a pressure between fixing roller 17a and sticking-by-pressure roller 17b. [0035] On both sides of toner image television object 14a, the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means counters guide-idler 14f by the side of fixing equipment 17, is formed, and cleans the transfer residual toner on toner image television object 14a to toner image television object 14a by using a pivot 142 as the rotation supporting point by the toner image television object cleaning blade 141 in which contact and contact release are possible. It counters with guide-idler 14j by the side of penetration of imprint material, and toner image television object cleaning equipment 140 can also be prepared.

[0036] Next, a double-sided image formation process is explained. If the start of image recording is made, in picture read station A, the image data of the manuscript picture read by the image pck-up element or the image data of the picture edited by computer will be processed in the image-data-processing section B explained later as a picture signal according to each color of C (cyanogen), M (Magenta), Y (yellow), and K (black).

[0037] It rotates to the clockwise rotation which the photo conductor drum 10 of the image formation unit 100 of cyanogen (C) shows by the arrow of <u>drawing 1</u> by starting of the photo conductor drive motor which is not illustrated by the start of image recording, and grant of potential is simultaneously started by the photo conductor drum 10 of C by electrification operation of the scorotron electrification machine 11 of C.

[0038] After potential is given to the photo conductor drum 10 of C, the picture writing (exposure) by the 1st chrominance signal about a rear-face picture, i.e., the electrical signal corresponding to the image data of C, is started by the exposure optical system 12 of C, and the electrostatic latent image corresponding to the picture of C of a manuscript picture is formed in the photosensitive layer of the front face of the photo conductor drum 10 of C. [0039] Reversal development of the aforementioned latent image is carried out in the state of [non-contact] contact by the development counter 13 of C, and the toner image of cyanogen (C) is formed according to the rotation on the photo conductor drum 10 of C.

[0040] The toner image of C used as the rear-face picture formed on the photo conductor drum 10 of C of the above-mentioned image formation process is imprinted by imprint machine 14c of C on toner image television object 14a in imprint region 14b of C.

[0041] Subsequently, the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) Potential is given by electrification operation of the scorotron electrification machine 11 of M, and the toner image of C on toner image television object 14a and a synchronization are taken. The picture writing (exposure) by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of M, is performed by the exposure optical system 12 of M, and the toner image of the Magenta (M) which serves as a rear-face picture by the contact or the non-contact reversal development by the development counter 13 of M is

formed. The toner image of this M is imprinted by imprint machine 14c of M on toner image television object 14a in imprint region 14b of M, and the toner image of the upper shell M of the toner image of the aforementioned cyanogen (C) piles up, and is formed.

[0042] According to the same process, the superposition toner image of Above C and M and a synchronization are taken. The toner image of Y used as the rear-face picture corresponding to the image data of Y by the 3rd chrominance signal formed on the photo conductor drum 10 of Y of the image formation unit 100 of yellow (Y) sets to imprint region 14b of Y. Of imprint machine 14c of Y, the toner image of the upper shell Y of the superposition toner image of Above C and M piles up, and is formed. Furthermore, the toner image of K used as the rear-face picture corresponding to the image data of K by the 4th chrominance signal which the superposition toner image of C, M, and Y and synchronization were taken, and was formed on the photo conductor drum 10 of K of the black (K) image formation unit 100 In imprint region 14b of K, of imprint machine 14c of K, the toner image of the upper shell K of the toner image of Above C, M, and Y piles up, and is formed, and the superposition color toner image of four colors of C, M, Y, and K of a rear-face picture is formed on toner image television object 14a (drawing 2 (A)). [0043] The toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint results in the cleaning equipment 19 which is a photo conductor drum cleaning means, and is cleaned by cleaning-blade 19a which consists of the rubber material which contacted the photo conductor drum 10.

[0044] After the piled-up color toner image which turns into a rear-face picture on toner image television object 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face picture currently succeedingly supported by toner image television object 14a is taken, and the toner image of C which turns into a surface picture of C by the image formation unit 100 of C is formed on the photo conductor drum 10 of C like the aforementioned color picture formation process. Under the present circumstances, image data is changed so that the surface picture of C formed on the photo conductor drum 10 of C may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C.

[0045] In connection with the surface image formation of C to the photo conductor drum 10 top of C, from the feed cassette 15 whose recording paper P which is imprint material is an imprint material receipt means It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. by the drive of timing roller 15b The synchronization with the toner image of the surface picture of C supported on the photo conductor drum 10 of C and the color toner image of the rear-face picture currently supported by toner image television object 14a is taken, and imprint region 14b of C is fed. Under the present circumstances, paper electrification of the recording paper P is carried out at a toner and like-pole nature, toner image television object 14a is adsorbed by the brush-like paper electrification machine 150, and the nose of cam where it considered as the contact state and the direct current voltage of a toner and like-pole nature (it sets in this operation form and is minus polarity) was impressed to the recording paper P is conveyed with it to imprint region 14b of C (drawing 2 (B)). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on toner image television object 14a, or the toner image on the photo conductor drum 10 of C, and disorder of a toner image is prevented. Instead of the brush-like paper electrification machine 150, you may use a corona-electrical-charging machine.

[0046] In imprint region 14b of C, the surface picture on the photo conductor drum 10 of C is imprinted by imprint machine 14c of C to which polar (it sets in this operation form and is plus polarity) voltage opposite to a toner was impressed on the front face of the recording paper P. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting.

[0047] Similarly the synchronization with the color toner image of a rear-face picture and the toner image of the surface picture of C which are supported by toner image television object

14a is taken. The toner image of the surface picture of M, Y, and K is formed on the photo conductor drum 10 of each image formation unit 100. M, Y, and K — the toner image of the surface picture of M, Y, and K — M, Y, and K — each imprint region 14b — a toner and opposite polarity (in this operation form) The color toner image of the surface picture of M, Y, and K on each photo conductor drum 10 is imprinted one by one on the front face of the recording paper P in order of M, Y, and K by each imprint machine 14c to which the voltage of ** plus polarity was impressed at the toner image top of C. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting. Image data is changed so that the surface picture of C, M, Y, and K which are formed on the photo conductor drum 10 of C, M, Y, and K may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C, M, Y, and K, respectively.

[0048] The recording paper P with which the color toner image was imprinted by the front face is conveyed at 14g of rear-face imprint machines which impressed polar (it sets in this operation form and is plus polarity) voltage opposite to a toner, and the color toner image of the rear-face picture on the peripheral surface of toner image television object 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P.

[0049] Moreover, simultaneously with passage just before passage of the back end of the recording paper P, from toner image television object 14a, contact release is carried out and the paper electrification machine 150 is estranged with the recording paper P (<u>drawing 2</u> (C)). Impression of the voltage to the paper electrification machine 15 is only a time of the recording paper P being sent, and the voltage currently impressed simultaneously with alienation with the recording paper P to the paper electrification machine 150 is disconnected.

[0050] The electric-discharge operation of 14h of paper separation AC electric-discharge machines as an imprint material separation means performed by next using together with curvature separation drive roller 14d if needed [curvature separation or if needed] dissociates from toner image television object 14a, and the recording paper P with which the color toner image was imprinted by both sides is conveyed through the conveyance section 160 in which the spur 162 was formed to fixing equipment 17. ****** to which the recording paper P applies heat and a pressure in fixing equipment 17 between fixing roller 17a and sticking-by-pressure roller 17b — things are fixed to the toner image on the rear face of front of the recording paper P, the picture of the front reverse side is reversed and sent and the recording paper P with which double-sided image recording was made is discharged with the delivery roller 18 to the tray of the equipment exterior

[0051] The toner which remained on the peripheral surface of toner image television object 14a after an imprint uses as the rotation supporting point the pivot 142 which countered guide-idler 14f and was prepared on both sides of toner image television object 14a, and the contact and the contact release to toner image television object 14 a are possible for it, and it is cleaned by the toner image television object cleaning blade 141 of the toner image television object cleaning equipment 140 made into a contact state at toner image television object 14a.
[0052] Moreover, cleaning-blade 19a of cleaning equipment 19 removes a remains toner, the history on the photo conductor drum 10 by previous image formation is canceled by the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle.

[0053] Of course, also do single-sided image formation which forms a picture in one side of only the front face of imprint material, or a rear face other than the double-sided image formation which forms a picture in both sides of imprint material which was explained with the above-mentioned operation form with above double-sided image formation equipment.

[0054] Here, the circuitry of the above color picture formation equipment which consists of

aforementioned picture read station A, the image-data-processing section B, and the image formation section D is explained according to the block diagram of <u>drawing 3</u> and <u>drawing 4</u>. [0055] First, in picture read station A, the analog picture signal of three colors which are outputted from the aforementioned image pck-up element CCD and which carried out color separation is changed into a digital image signal (image data) by A/D converter B11, and is outputted to the image-data-processing section B through an interface B12.

[0056] The digital image signal (luminance signal) inputted into the image-data-processing section B is first changed into concentration information by the concentration conversion B13. [0057] And variable power processing according to variable power specification of a user is performed by the enlarging-or-contracting processing B14. Moreover, in the picture distinction processing B15, character drawing and photograph drawing are distinguished based on the concentration information changed by the aforementioned concentration conversion B13, the filter shape in filtering B16 is set up based on this distinction result, and spatial filter processing is performed by filtering B16 according to the aforementioned setup.

[0058] In addition, the aforementioned picture distinction processing B15 shall be equivalent to the picture distinction means and processing property adjustable means in this operation form, and distinction of character drawing and photograph drawing shall include distinction of the character picture field in the mixture picture of character drawing and photograph drawing, and a photograph field.

[0059] Here, in order to replace filtering and variable power processing and to make them perform according to specification of enlarging or contracting, the data selectors B17 and B18 of a couple are formed. The exchange with the aforementioned filtering and variable power processing is performed in order to prevent the moire of the half-tone-dot drawing looked at by the picture at the time of reduction processing.

[0060] On the other hand, the EE processing B19 obtains histogram data, in order to acquire the feature of a manuscript picture from the image information obtained by the preece can in front of this scan. And CPU of the image-processing system which is not illustrated provides gamma amendment processing B20 with proper gamma amendment data based on the aforementioned histogram data.

[0061] The image data (concentration information) to which filtering and variable power processing were performed is outputted to the picture field processing B21, after gamma amendment according to the property of the image formation equipment B25 later mentioned by the aforementioned gamma amendment processing B20 is given the aforementioned picture field processing B21 — others [extraction / of the effective picture field of a manuscript] — ****(ing) — ******(ing) — etc. — field processing is also performed

[0062] The image data (concentration information) which changed into the final output state to the image formation equipment B25 which all image processings required for image formation are performed as mentioned above, and is mentioned later is outputted to the image formation section D through an interface B22.

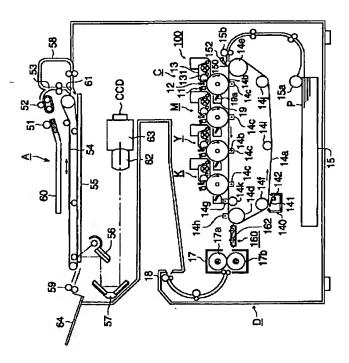
[0063] In the image formation section D, with the function to carry out image formation to the photo conductor drum 10 top to real time to the read of a manuscript The data selector B91 which reads the image data which carries out two or more storage maintenance of the inputted image data in the picture storage section B23, and was this memorized afterwards to arbitration, It has the picture amendment processing B92 in which picture amendment is performed corresponding to a table/reverse side, and the function to make image formation perform from the amended image data.

[0064] Here, with this operation form, the function to read alternatively from after the image data which a manuscript picture is read as mentioned above, it is obtained, and ** also saves the image data to which all required image processings were performed, and was this saved, and to make image formation perform shall be called an electronic RDH function.

[0065] The picture storage section B23 memorized possible [rewriting of image data] in it in

order to realize the aforementioned electronic RDH function other than the image formation equipment B25 which is a LASER beam printer etc. in the image formation section D

Drawing selection [Repr sentativ drawing]



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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section block diagram showing an example of the image formation equipment of this invention.

[Drawing 2] It is explanatory drawing showing supply of a toner image formation state and imprint material.

[Drawing 3] It is the block diagram showing an example of a circuit used for this invention.

[Drawing 4] It is the block diagram showing the detail of picture amendment processing of drawing 3.

[Drawing 5] It is explanatory drawing showing the stacking order of each color toner in the front reverse side of imprint material.

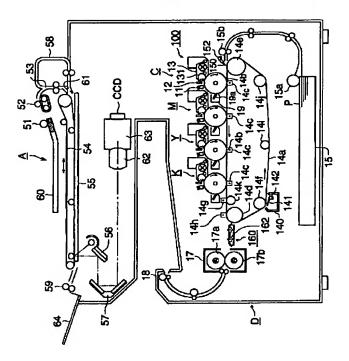
[Drawing 6] It is the graph which shows the spectral-reflectance curve of each color toner used.

[Drawing 7] It is the graph which shows the spectral-reflectance curve of each ideal color toner.

[Description of Notations]

- 10 Photo Conductor Drum (Image Formation Object)
- 11 Scorotron Electrification Machine
- 12 Exposure Optical System
- 13 Development Counter
- 14a Toner image television object (middle imprint object)
- 14c Imprint machine
- 14g Rear-face imprint machine
- 14h Paper separation AC electric discharge machine
- 17 Fixing Equipment
- A Picture read station
- B Image-data-processing section
- D Image formation section
- P Recording paper (imprint material)

Drawing selection [Representative drawing]



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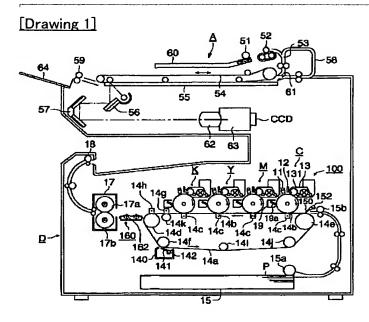
[JP,2002-031933,A]
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[Translation done.]

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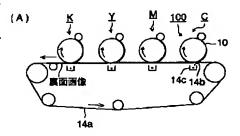
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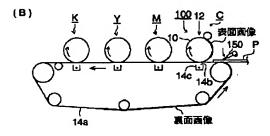
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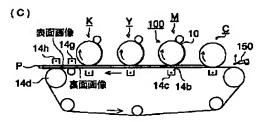
DRAWINGS

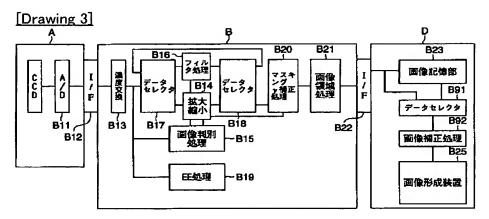


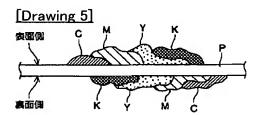
[Drawing 2]





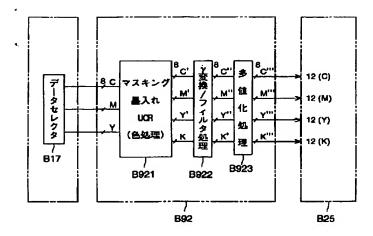


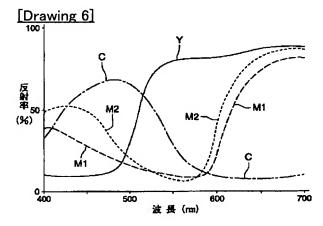


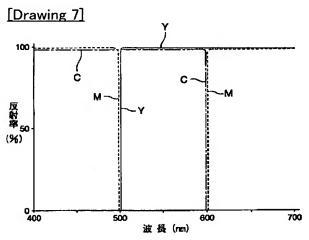


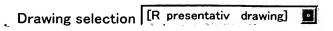
[Drawing 4]

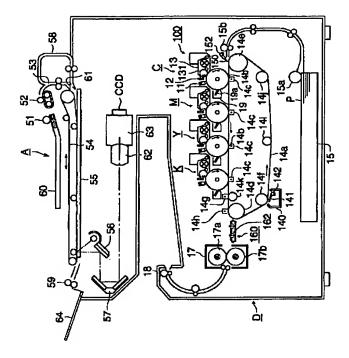
2/3











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